PROMOTING THE EXPORT OF U.S. ENVIRONMENTAL TECHNOLOGIES, GOODS AND SERVICES

Y 4. M 53: 103-2

Promoting the Export of U.S. Enviro...

RING

E THE

SUBCOMMITTEE ON ENVIRONMENT
AND NATURAL RESOURCES

OF THE

COMMITTEE ON
MERCHANT MARINE AND FISHERIES
HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRD CONGRESS

FIRST SESSION

ON

HOW TO MAINTAIN BOTH A CLEAN, HEALTHY ENVIRONMENT AND CREATE JOBS THROUGH DEVELOPMENT OF A U.S. ENVIROTECH INDUSTRY AND EXPORT THESE TECHNOLOGIES TO DEVELOPING COUNTRIES

FEBRUARY 25, 1993

Serial No. 103–2

Printed for the use of the Committee on Merchant Marine and Fisheries

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PROMOTING THE EXPORT OF U.S. ENVIRONMENTAL TECHNOLOGIES, GOODS AND SERVICES

THURSDAY, FEBRUARY 25, 1993

House of Representatives, Subcommittee on Environment and Natural Resources, Committee on Merchant Marine and Fisheries,
Washington, DC.

The subcommittee met, pursuant to call, at 10:00 a.m., in room 1334, Longworth House Office Building, Hon. Gerry E. Studds (chairman of the subcommittee) presiding.

Present: Representatives Studds, Pallone, Furse, Lambert, Eshoo, Gilchrest, and Cunningham.

Staff Present: Lesli Gray, Staff Assistant; Joan Bondareff, Senior Counsel; Will Stelle, General Counsel; Karen Steuer, Professional Staff; Laurel Bryant, Minority Professional Staff; Sue Waldron, Press Secretary; Leigh Clayton; Robert Wharton; Ruth Freesland; Mary Kitsos, Chief Clerk; Judy Alvarez; Margherita Woods, Minority Clerk; Tom Melius, Minority Professional Staff; Cindy Wilkinson, Minority Counsel; and Jayneanne Rex, Minority Staff.

STATEMENT OF HON. GERRY E. STUDDS, A U.S. REPRESENTATIVE FROM MASSACHUSETTS, AND CHAIRMAN, SUBCOMMITTEE ON THE ENVIRONMENT AND NATURAL RESOURCES

Mr. Studds. The subcommittee will come to order.

Over the past 12 years we have heard a great deal about having to choose between business on the one hand and environmental considerations on the other, between jobs and endangered species. Some of us have suspected all along that the two are not mutually exclusive.

This morning we will hear from a panel of distinguished witnesses who are going to tell us, hopefully, how we can do both: maintain a clean, healthy environment and create jobs through the development of a U.S. envirotech industry. This is a buzz word but I want to use it anyway.

Today, this country has some 58,700 companies in the envirotech business with combined revenues of $120 billion in 1991. This industry has grown greatly in response to the very strict environmental laws and regulations in this country.

In addition to serving the domestic market, the U.S. industry is poised to take advantage of an exponential growth in the world market for environmental goods and services. The OTA estimates that in 1990 the global world market for environmental goods and services was $200 billion, and will grow in a few years to $300 billion.

My own State has been in the forefront of this green revolution, if you will, with over 1,300 environmental companies employing over 40,000 people and doing already over $10 billion annually worth of business.

While businesses in Massachusetts and some other States are doing what they can to take advantage of the fact that the world market for environmental goods and services is growing very fast, the government at the Federal level is not doing what it can to capture the moment. By contrast with Japan, which seized the economic opportunities presented by the 1992 Earth Summit, our own government has been sitting back and hoping for industry to do its own thing.

It is clear that the new administration and the U.S. Secretary of Commerce have recognized this moment and have spoken to the necessity for the Federal Government to do something a good deal more creative and productive.

We have asked our witnesses today also to comment on a proposal to establish through legislation a partnership between the government and the United States environmental technology industry.

Let me just say that while we have given the witnesses an outline of a possible proposed legislation, and although it bears my name, I am by no means wed to the details of it. In fact, I am allergic to the proposition we are going to create three new entities of any kind, at this point governmental, or even partially governmental.

So I would ask the witnesses to feel more than free to use their own imagination in suggesting what we do or do not need, whether we need a new office in the Department of Commerce, whether we need a new public-private venture, whether we need a new component within the Peace Corps—all of these ideas are floating around, but I suspect we will have difficulty suggesting that what the government most needs is one or two or three new agencies.

It is a wide open field. The potential for doing good things profitably is an appealing one, particularly to a New Englander. If one can do well by doing good, one has satisfied something very fundamental in one's New England roots. In this case, it seems to me it is not only a regional opportunity but a national one. The world has a lot of catching up to do in terms of essential environmental progress.

That means, among other things, a lot of work, a lot of business, a lot of jobs, a lot of dollars. There is no reason in the world why we should sit back and watch our competitors seize that moment. That is why we have done the work we have done to date, and why I am hopeful that when the new administration finally gets its folks in order, we may have a partnership here.

Are there additional opening statements?

The gentlewoman from Oregon.

STATEMENT OF HON. ELIZABETH FURSE, A U.S. REPRESENTATIVE FROM OREGON

Ms. FURSE. Mr. Chairman and Members of the committee, it is a great pleasure to participate in this hearing concerning Federal support for the export of environmental technology. In my opinion, no topic that we will address during this Congress has so much promise for the world, the Nation, and indeed for my State, the State of Oregon.

World demand for environmental technology, goods and services is projected to increase at the rate of 15 percent per year because of a growing awareness of our finite environmental resources, as mirrored in the Rio agreements, the NAFTA controversy and the environmental decay of the former Soviet Union. The U.S. is able to supply the technology and scientific know-how to address these problems.

Oregon is a leader in the field because of our State's progressive environmental laws that spawn so much of the technology we are seeking to support.

With regard to Oregon, I would like to enter in the record excerpts from the magazine Oregon Business, demonstrating the breadth of commitment that Oregon businesses and academic community has made already to environmental technology.

I also recently had an opportunity to meet at length with Don Connors, a founder of the Environmental Business Council, and I commend the Chairman for his foresight in nurturing some of Mr. Connors' ideas. I look forward to Mr. Connors' testimony, as I do to the testimony of Dwight Sangrey, President of the Oregon Graduate Center, which will be presented today by Dr. Norm Eder, and the written testimony of the Oregon Environmental Technology Association as represented by Mr. Gene Davis, an association board member and an Oregon businessman.

It is a great pleasure to participate in these hearings. I thank you, Mr. Chairman, for the opportunity.

Mr. STUDDS. The gentleman from California.

STATEMENT OF HON. RANDY "DUKE" CUNNINGHAM, A U.S. REPRESENTATIVE FROM CALIFORNIA

Mr. CUNNINGHAM. Thank you, Mr. Chairman.

I would like to associate myself with the remarks of the Chairman. I am not an extremist environmentalist, but this is an area where we can support NAFTA and do a lot of good things at the same time.

For my colleague from Oregon, I hunt and fish up there, and since I think 70 percent of all new Oregonians are Californians purchasing land up there are, we can work real well together.

I would like unanimous consent to insert Congressman Fields' opening remarks, and I would also like to let our guests know that the Republicans have not missed this hearing on purpose. I myself will be going to Princeton. We have our party conference in Princeton so that is where everybody is this morning. We haven't slighted you, and I have agreed to be here so we can hold hearings.

Thank you very much.

[The statement follows:]

STATEMENT OF HON. JACK FIELDS, A U.S. REPRESENTATIVE FROM TEXAS, AND RANKING MINORITY MEMBER, COMMITTEE ON MERCHANT MARINE AND FISHERIES

Mr. Chairman, I am pleased that the Subcommittee on Environment and Natural Resources is holding a hearing today on issues relating to the establishment of a national program to promote the export of U.S. environmental technologies, goods, and services.

Mr. Chairman, it is sound public policy to encourage the use and export of environmental technologies. There is an expanding market for these products, particularly among developing nations. I am encouraged by the increasing number of businesses and associations that are forming to meet these needs. As someone who represents a city with the third largest port in the United States, I have a keen interest in trade matters.

I believe it is important to support private enterprise efforts that export U.S. products and I understand the need for some coordination with the Federal Government. However, I am hesitant to create additional bureaucratic hoops for the private sector to jump through.

I look forward to the testimony that we will hear today as it will be helpful in determining the role government should play in assisting this growing industry.

Thank you, Mr. Chairman.

Mr. STUDDS. The committee notes with interest the gentleman's strides toward being an extreme environmentalist.

The gentleman from Maryland.

STATEMENT OF HON. WAYNE T. GILCHREST, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MARYLAND

Mr. GILCHREST. Thank you, Mr. Chairman.

I don't really have an opening statement except to say I look forward to the testimony. I think we are moving in a new direction for the Nation and the world as far as understanding our relationship to the ecosystem and how we can best benefit from that and derive security by enhancing our productivity.

I often think of the environment as starting with microorganisms being a part of the ecosystem, and shopping plazas now being a part of the ecosystem, as well as highways and chemical factories. We are all here together.

So we must find an alternative way to the traditional and conventional ways of doing things. When I was in school I can remember in about the 7th grade, I think Mr. Studds being from Massachusetts probably learned this in second grade, but we weren't quite as advanced as, I am sure, the schools in Massachusetts, but I learned about the word environment. It meant everything. So when we talk about the environment, it means everything.

So if we can capture through creativity the essence of the science of ecology and how we fit into it, future generations will bless us, I am sure. So I look forward to the testimony and pursuing some of your recommendations.

Thank you, Mr. Chairman.

Mr. STUDDS. It is always a delight to have genuine conservatives on this side.

Let me say there are people who cannot find seats. You are more than welcome to sit down on the lower tier here. No one will accuse you of working here. Feel free, especially if you need to write, or even if you don't, you are welcome to sit down here.

As Mr. Cunningham was saying, the Republicans are in retreat this weekend, which seems somehow appropriate. They are retreating to New Jersey, which has some historical significance. They are regrouping. Normally under these circumstances, we would immediately call up the bill and enact it. However, it is not written yet, so that would seem a bit premature.

We are delighted to have the witnesses we do. Let me say we are going to proceed with you as a single panel, and I trust you have already been asked by the staff to confine your oral remarks to no more than five minutes. That should be very easy for the representatives of the administration, as I understand it, since there is no policy yet, and it shouldn't take more than five minutes to convey that. The rest of you who have longer written statements, you can rest assured it will appear in the record so that future historians will believe you delivered every word with passion and conviction.

We will hear you in the order in which you appear on the witness list, then we will ask questions of you as a single panel.

Mr. John Menes, Acting Assistant Secretary—we have a lot of those—for trade development, Department of Commerce.

Mr. Menes.

STATEMENTS OF JOHN MENES, ACTING ASSISTANT SECRETARY FOR TRADE DEVELOPMENT, U.S. DEPARTMENT OF COMMERCE; DIANA H. JOSEPHSON, DEPUTY UNDER SECRETARY, NATIONAL OCEANIC ATMOSPHERIC ADMINISTRATION; GRANT FERRIER, PRESIDENT, ENVIRONMENTAL BUSINESS INTERNATIONAL, INC.; TOM CAMPBELL, GENERAL COUNSEL, ENTRIX, INC.; HILARY FRENCH, SENIOR RESEARCHER, WORLDWATCH INSTITUTE; AND NORMAN R. EDER, VICE PRESIDENT FOR PUBLIC AFFAIRS, OREGON GRADUATE INSTITUTE OF SCIENCE AND TECHNOLOGY

STATEMENT OF JOHN MENES

Mr. MENES. Thank you, Mr. Chairman. I will try to confine myself to five minutes.

Mr. STUDDS. Let me just add that the little lights in front of you, if you haven't had it explained, when the yellow light goes on you have one minute left, and when the red light goes on, you have concluded.

Mr. MENES. Very efficient. My remarks this morning, I just want to touch on several areas. One is the global market, which you have already referred to; U.S. competitiveness; and ITA's role.

A couple of comments are in order. Most importantly from a statistical standpoint, it is a very difficult market to deal with because it has no precise statistical definition. Hence, there is a lack of good data, and any remarks we make are just orders of magnitude and frequently not comparable. It is an unfortunate circumstance but difficult to remedy.

As you already noted, the only comprehensive study of the market for environmental technologies, equipment and services was that done by the Organization for Economic Cooperation and Development, OECD, which estimated a market of about $200 billion in 1990 to reach about $300 billion by the year 2000.

Currently, about 85 percent of this market is in the 22 industrial countries that are members of the OECD. The U.S. has about 40 percent of this market.

Turning to other parts of the world, the Asian environmental market is expanding rapidly. We estimate based on reports from the Foreign Commercial Service overseas and other sources that non-communist Asia will have expenditures of over $30 billion. Taiwan plans to spend $12 billion alone in environmental improvements by 1998.

The United States has 25 percent of the imports in this sector. Hong Kong also offers very favorable market and procurement policies for the U.S., and apparently intends to spend $20 billion on environmental-related projects over the next decade. Korea is also a strong market.

Switching to another part of the world, in Eastern Europe we find one of the most interesting situations as a result of the change in environmental accountability, if you will, and the department believes that the U.S. Government has a very special role to play in helping the U.S. industry take advantage of the opportunities that these countries face as part of the Communist legacy. We are optimistic that future growth will raise the absolute size of the market.

In contrast to Eastern Europe, Western Europe represents the single largest environmental market, about $68 billion. However, these countries have strong domestic and environmental industries, and pose very large problems for us.

Turning to Latin America, Mexico represents the largest market. In 1992, we estimated the market at about $1.1 billion, and with currently 45 percent of the import market, which is a portion of that.

There is very strong competition from Japan, Germany, France and Switzerland. Japan is offering about $4.6 billion in loans and credit that have been extended to the Mexican government to address the air pollution problems in Mexico City.

Outside of Mexico, other key countries are Brazil, Venezuela, Chile, Argentina and Colombia. They represent a $2 billion market.

Basic to our export potential is our competitiveness. The United States exports 10 percent of its output in environmental technologies, and has about a $4 billion trade surplus, keeping in mind the caveats I mentioned earlier. However, the industry is experiencing import penetration in waste treatment collection systems, and air pollution control systems from Japanese and Asian companies.

Germany and Japan are the two largest competitors. Germany is the leader in pollution abatement equipment; Japan is a major exporter of air pollution control products. Both countries appear to be following strategies designed to ensure they capture a large share of the developing countries markets.

Turning now to what ITA is doing, first let me talk about the export promotion. There are basically two elements. First is identifying potential markets and opportunities overseas; and second, we utilize a number of techniques to help U.S. industry capitalize on these opportunities. In particular, trade missions, trade exhibits, seminars and conferences.

In addition, we have recently initiated a new effort to combine technical and education seminars with a business forum designed to match U.S. suppliers with foreign customers. ITA has organized more than 30 successful environmental trade events. We plan to expand this effort, especially in the NIS countries of Russia and the People's Republic of China and Latin America.

We also provide business counseling. In addition, we have a generic Export Assistance Program. In the national trade data bank currently there are analyses specifically on the environmental sector market. Some of those are quite lengthy.

In addition, we chair a trade promotion coordinating committee for U.S.-Asia environmental partnership which is co-chaired by AID's assistant administrator for Asia.

Another ITA environmental initiative is the U.S.-Mexico Environmental Business Committee, created under the auspices of the Joint Committee on Investment and Trade. The objectives are to achieve a multiplier effect to provide access to a broad range of U.S. companies.

In the policy area, we are extensively involved with other agencies in helping develop the U.S. Government's position with regard to international environmental meetings and treaty negotiations.

In summary, we think the industry has excellent potential. ITA is working with representative trade industry groups, educational institutions and other Federal agencies. We believe that by promoting environmental technologies, products and services we can make a significant contribution to creating jobs and industry where strong demand exists overseas and will continue into the next century.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Menes can be found at the end of the hearing.]

Mr. STUDDS. Our next panelist is one of the rarest of species, a living Presidential appointment in office. Ms. Diana Josephson, Deputy Under Secretary of NOAA.

Welcome.

STATEMENT OF DIANA H. JOSEPHSON

Ms. JOSEPHSON. Thank you. I am especially pleased to appear at one of the first hearings of this newly created Subcommittee. I can tell you that it is good to be here and I look forward to working with you and my NOAA colleagues.

Today's hearing is important and timely. As President Clinton has repeatedly stressed, jobs and environmental protection are not in competition. Rather, it is widely recognized that environmental protection has numerous economic benefits.

We believe that NOAA can contribute to the Department's important role in promoting exports of U.S. environmental technologies. We would like to assist your deliberations by familiarizing you with some of the equipment for oceanic and atmospheric monitoring.

Second, discussing the important role of capacity building, training and transfer of know-how in expanding U.S. markets.

Third, identifying a few existing U.S. Government programs which provide environmental technologies to foreign markets.

And finally, offering a few suggestions regarding the possible proposal to promote exports of environmental technology, as mentioned in the letter of invitation.

Before addressing these areas, allow me to make three points about NOAA's role in creating demand in foreign markets through its research and monitoring programs.

First, our scientific research demonstrates to foreign nations and corporations the existence of environmental problems by identifying the effects of their actions on earth systems.

Second, our scientific programs demonstrate that these problems can be rationally addressed, thereby giving the confidence to proceed with sensible remedial or preventive steps.

Finally, NOAA's science provides the world with sophisticated tools for use in attaining sustainable development. As a result, we help generate a demand in foreign markets for U.S. environmental technology.

This reflects an important NOAA contribution to the vigor of the U.S. economy.

Time does not allow me to describe to you all of the technologies with which NOAA has been involved. We have described some 32 areas in the more detailed written statement. They apply both in the atmospheric side and on the ocean side.

I would be happy to elaborate on any of these programs for the record should the subcommittee wish additional information.

Turning now to capacity building, training is an important but not always recognized aspect of an effective national technology export policy. Explanations of the use and advantages of sophisticated technologies expand markets for U.S. products.

The recently concluded United Nations Conference on the Environment and Development (UNCED) highlighted the global need for technology cooperation on the environmentally sound technologies.

NOAA's science, technology and natural resource conservation training and education activities also provide an important contribution to help achieve UNCED's objectives. Several examples of capacity building programs can be found in my written statement.

With respect to government programs, NOAA already participates in several Department of Commerce programs and is ready to initiate new undertakings in close cooperation with our fellow Commerce agencies. The Commerce Department leads two initiatives to promote the sharing of U.S. industries' world class environmental technologies: the National Environmental Technologies Trade Initiative, which provides information and education to developing regions about the need for environmental technologies and service, and the Private Enterprise and Government Interaction Working Group, which facilitates environmental and global change search interactions between the private sector and the U.S. Government.

In closing, Mr. Chairman, I would like to give some preliminary comments on the outline for legislation you have prepared. The Department intends to offer detailed comments, after having an opportunity to review the legislation, when drafting is completed.

As you will have noted from the examples of technology export and training described in my more detailed statement, NOAA's efforts in this regard are closely tied to its mission. I believe a new office headed by a new Department Under Secretary as set forth in the outline you have circulated is unnecessary.

NOAA is best able to undertake its responsibilities if its authorities are not abridged through reorganization. We believe Federal agencies can cooperate through interagency coordination. Perhaps particular attention ought to be focused on coordination with bilateral and multilateral assistance programs.

There is an interagency group, the Trade Promotion Coordinating Committee, chaired by the Secretary of Commerce, which my ITA colleague here can discuss more fully.

NOAA can play a strong role by contributing its expertise in identifying the need for and use of environmental technologies as well as in developing new technologies. I hope these ideas are of use to the Subcommittee as you further consider this important policy issue.

I will be pleased to answer any questions.

[The prepared statement of Ms. Josephson can be found at the end of the hearing.]

Mr. STUDDS. Thank you very much.

Next, Mr. Grant Ferrier, the President of Environmental Business International, the publisher of a magazine on environmental business from San Diego.

STATEMENT OF GRANT FERRIER

Mr. FERRIER. Thank you, Mr. Chairman, Members of the committee.

We are a research firm serving the environmental industry in the United States. We have sold market research products to these companies for six years now. So we have gained a lot of intelligence on the industry and done a lot of our own research.

A lot of the data on the market, clearly the rationale for this program, is obvious, and listed already in the previous comments. Part of that is in my written statement. And the data as well, how big the market is and the scope of the opportunity, is also in attached data sheets to my written submission. So can you review that and refer to that later. I won't go through the numbers.

I would like to cover what I consider key factors about the environmental industry that make it unique, and therefore dictate a unique strategy for the government in promoting it.

The first is that the industry is very fragmented and diverse. It is made up of a number of medium to small companies that either have no experience at exporting or hasn't occurred to them historically that would be a portion of their business. A number of them are biotechnologies and scientists who have not developed into business practices and business training as much as other business. So again, they need support, and the support of the government would be appreciated to help them get into the export markets.

Also, this industry again is diverse and fragmented. Programs related to hazardous waste cleanup are very different from companies in air pollution control or alternative energy or solid waste management, for instance. So when approaching this industry, it is very important to look at the different segments of the industry and the different business segments they operate.

There are very few environmental companies that solve all environmental problems, besides the engineer types, but people selling equipment often operate in these areas segments. So it is very important to look at the various companies that operate in this industry.

Regulations from a domestic standpoint have made this industry, and indeed most companies will tell you the most important factor in driving U.S. competitiveness is maintaining a very strong regulatory approach here in the United States to foster the competitiveness of our companies. So it is very important to maintain the market here.

There are examples of our regulations laxing over the last 10 years, and foreign companies helping their technologies and their markets and gaining an advantage over us. That certainly is an area we can't let happen in the future, as this market is indeed high.

Another key factor to consider is technology and the development of technology. The majority of the environmental problems faced by the world in the next 10 years, and solutions will be very low tech applications of existing technologies and existing solutions. They are solid waste problems, they are water treatment issues, there are air pollution issues that we have the technology for. We know how to do it here. They don't have the money there to do it.

Clearly, we need to match our ability to solve these problems as existing and our financial knowledge and the financial mechanisms that the world can generate to help the developing nations solve their problems.

So, clearly, the technology issues are also important for the eventual move to a sustainable economy, and it is very important to look at environmental technologies from both the control and pollution prevention side. Technologies, in other words, make up for the sins of the past. The cleanup technologies, the water technologies, essentially controlling pollution, and the other side technologies, which are the future technologies, the replacement things like electric vehicles and solar energy and so forth.

So it is very important when looking at the technologies that you must have different programs to stimulate the short-term, vastly growing markets. You hear the numbers about great growing markets; these are basically making up for sins of the past. And those are markets that will certainly be very strong growing for 20 years or so, but again, won't be a market that grows forever and ever and ever.

Alternatively, there are those technologies of the future that will create the more environmentally sustainable society as I mentioned, such as new energy systems, transportation systems, products that do not generate waste and so forth.

This is a lot of the focus of what the Japanese are doing. They are focusing on that long-term transition technology that will be truly sustainable from an environmental standpoint.

I think an important way, again, to finalize the comments on how the government can support this and support programs will be to, again, highlight the fact that it is a very diverse and fragmented business. The global market is tremendous, but it is very hard to find pieces. And both previous testimonies have said it is very difficult to quantify where the opportunities are.

An objective of such a U.S. program can be to identify a matrix of the type of technologies we possess against the countries, and markets, that have the best promising opportunities, and match those to the cells in the matrix of the greatest opportunity that the government can provide support to.

Thank you.

[The prepared statement of Mr. Ferrier can be found at the end of the hearing.]

Mr. STUDDS. Thank you very much.

Next, Mr. Donald Connors, Chairman of the Environmental Business Council of New England. He happens to be a constituent and a friend, and more than any other person is responsible for the seminal thinking, if you will, that has gone into focusing me on the subject. As a leader in the field, Don, welcome.

STATEMENT OF DONALD L. CONNORS

Mr. CONNORS. Thank you very much, Mr. Chairman.

On behalf of the envirotech industry, I would like to thank you and the Members of the committee for your interest and enthusiasm for this industry and for the opportunities to create good jobs to serve the environment, to be of enormous assistance to the people of the world.

There is a big environmental problem on this planet, and we believe that the United States has a unique repository of extraordinary skill and competence and technology that will be of great value to the nations of the world as we move in the 21st century toward the principles of sustainable development. If we can organize an effective relationship between the Federal Government—and by that I mean the leadership in the White House and the appropriate Cabinet officers and agencies, including EPA, Energy, Commerce, the State Department, and the United States Office of Development Assistance, presently we think of as AID, as it may be restructured—together with State governments and a better organized industry, we will have the opportunity to realize the extraordinary potential of service to the environment and economic development that lies before us at this date in February 1993.

I hope we can take up and organize a strategy to realize that potential. And that is the primary interest of the Environmental Business Council.

Now, a bit about the council. I am the founding Chairman of the Environmental Business Council. We are headquartered in Boston. We have members largely in the Northeast and eastern Canada, but we have some that have come from the Far East and other parts of the world. The Environmental Business Council represents the envirotech industry; companies which manufacture environmental products and energy products, companies which provide environmental consulting, environmental engineering services, technical institutions and other research and nongovernmental and nonprofit organizations, academic institutions, and State government.

We think that our partnership of industry, government, academic institutions, is central to the realization of the opportunities that lie before this industry in the future.

We organized the association a couple of years ago. As you know, I practice environmental law, and have done so, since it was called conservation law in the late 1960's. I have seen its growth and development and became aware in my travels around the world, in lecturing and consulting, that there is an enormous problem and there was a resource in the United States of extraordinary value. And we should connect that resource, bring it together, and find more effective ways to communicate with government about the opportunities and communicate with the industry members about opportunities.

And we have been extraordinarily successful. We have an initiative in Mexico undertaken over the past year, with CONCAMIN, which is the industrial trade association of that country. This has led to nearly $100 million in new business to our member companies, either business that has been committed, or is under consideration. And some extraordinarily interesting projects have grown from our agreement with CONCAMIN that we entered into as they asked, would you work with us in helping us be more effective in the implementation of environmental management systems in our industry in Mexico.

In actions pursuant to the agreement a half dozen groups of companies have visited Mexico. We have others going there soon. We have brought at our expense a group of industrial, academic and government officials to Boston for specialized training in hazardous risk management.

There are, Mr. Chairman, in Mexico, enormous opportunities for us to assist Mexican industry, help Mexico create a competent envirotech industry, and create business-to-business relationships that we call technology cooperation, the term used by the Earth Summit in Agenda 21, and by the Business Council for Sustainable Development in its study, "Changing Course."

Business-to-business relationships with nations of the world have enormous promise. We have been asked by the Western governors and leaders of industry throughout the country, including companies in Oregon, to assist in organizing a National Environmental Business Council, which we have started. We intend to launch it at a major conference later this year in June in Washington.

We think we will come with the cooperation of the Congress and the administration to a new partnership, a partnership that builds on the strengths of the regional clusters of environmental industry that you see laid out in the map accompanying my testimony, to execute successfully the promise of the envirotech industry, to help solve global environmental problems, and to create important, exciting, meaningful new opportunities for people and for companies in America.

[The prepared statement of Mr. Connors can be found at the end of the hearing.]

Mr. Studds. The red light does not always apply to constituents. Thank you very much.

Next, Mr. Tom Campbell, General Counsel of Entrix, Incorporated, from Houston.

STATEMENT OF TOM CAMPBELL

Mr. CAMPBELL. Thank you for the opportunity to be able to address you on what is a very important topic.

I agree with Congressman Gilchrest that the environment is, in fact, everything. But this is one of those rare opportunities where there is an unquestionable win-win. The environment can win and also U.S. industries can win, and individual people looking for good, high-paying, satisfying jobs can win.

I have the opportunity, having looked at this problem from two perspectives, from the government looking out, having been the lead of the Commerce Department delegation to the Rio summit, and from now a small to medium-size consulting firm in the environmental area looking in at the problem.

Congressman Studds, you are exactly right in your opening comments about the Rio summit. The most important part was the Sao Paolo environmental conference that took place in conjunction with the summit. At the summit, Japan announced this $200 billion figure and announced they intended to attack this market aggressively.

I had the opportunity to go from the summit in Rio over to Sao Paolo. The Japanese exhibit was literally seven times larger than the United States exhibit, and it was probably 10 to 20 times better than the U.S. exhibit. They had broken down environmental problems carefully into major components and described it using what would be the comparable agency to NOAA, explaining the earth systems and how there are problems with it. And then they explained how individual Japanese industries could provide solutions to each of those problems. At the end of the chain there was a pamphlet, a business card, and a salesman there to be able to sell their products.

This was a government-sponsored event. That is not identically the kind of framework the United States ought to offer its environmental technology and business community, but it is the type of cooperative framework that ought to be constructed by the government.

And what do we need? We need a comprehensive strategy. The Japanese and the Germans are in fact attacking this market in a comprehensive manner. What we need is two things. I would like to emphasize education and then access.

Education. Education of countries about the need for environmental technologies, explaining to them the true costs associated with the failure to do appropriate environmental planning.

We have the examples here. EPA can go and talk about the Love Canal and about the tremendous cost of remediating that area. NOAA can talk about the costs of environmental degradation and reducing the productivity and the safety the United States fisheries and other fisheries around the world.

Health agencies can go and talk about the problems that are caused by pollution, cholera and typhoid. You can quantify those costs into dollar amounts and you can show governments, you can show the people, the citizens of governments the tremendous drain that failure to conduct environmental planning has on their economies.

Once you have done that kind of education, there are also needs for internal education. I agree with the comments of the previous two speakers about the U.S. envirotech industry. I have had an opportunity to see them. It is run by technicians, it is run by engineers, and they tend to look inward to the United States market and they don't see the entire world and the tremendous opportunity that exists outside of this country. And there needs to be effort focused on it, educating U.S. small to medium-sized companies about the opportunity so that they can have the opportunity to compete in these markets.

And finally, access. Access. A good salesman knows that half of the sale is getting in the door. The United States Government, through the Commerce Department, through ITA, through the State Department, can ensure that—and can assist in seeing that appropriate government officials attend trade seminars so that U.S. businessmen have the opportunity to present their goods to people that in fact want to purchase them.

We conducted a pilot program in the Commerce Department where we in fact ran a seminar in Turkey, and in Turkey what we did was we brought the EPA and NOAA to talk about the cost of the problem, the Export-Import Bank came in and talked about the ability to finance projects and how they could do that. The State Department and ITA ensured that appropriate government officials, municipal officials were there, had the capacity to purchase equipment.

Then the U.S. industry got to listen to their problems, and then they the next day came in and presented their potential solutions to the variety of problems Turkey is facing. And Turkey is representative of a larger market of developing nations that are just beginning to waken to the tremendous need that they have, and U.S. industry can fulfill that need.

I thank you, Mr. Chairman.

[The prepared statement of Mr. Campbell can be found at the end of the hearing.]

Mr. Studds. Thank you very much.

Next, Ms. Hilary French from the Worldwatch Institute here.

Ms. French.

STATEMENT OF HILARY FRENCH

Ms. French. Thank you very much, Mr. Chairman, and Members of the committee for inviting me to testify here this morning.

I have recently authored a chapter in the Worldwatch's and the State of the World Report that looks at the interrelationships between world trade and the environment, and I am now expanding this chapter into a free-standing study on this subject next month.

Much of the focus on the environmental community has been on some of the dangers posed by the trend toward expanding world trade and through the expansion of trade agreements, such as the NAFTA and the Uruguay Round of GATT.

My chapter covers these threats and I think there are many we need to be very concerned about. But I also tried to look at some of the opportunities posed by trade for environmental protection around the world. And clearly, one of the greatest environmental benefits posed by freer trade is its potential to help distribute advanced environmental technologies worldwide.

I believe your proposed national program to advance these technologies and the export of them could be an important step toward this goal.

I would like to point to a few examples of cases where environmental technologies are contributing to improving the quality of life for people around the world. For example, villagers in the Dominican Republic are using photovoltaic cells shipped in from the United States to light their homes.

Here in the United States, many of the improvements in fuel efficiency that we saw in the 1970's in our automobile fleet were spurred in no small measure by competition from the Japanese.

So these are some of the kinds of benefits I think we can look to from trade. But I think we need to be explicit when we think about trade and trade agreements in trying to, while discouraging the environmentally harmful effects of trade, encouraging the benefits.

We have heard already this morning about the size of the market for environmental technologies around the world and the fact that it is expanding very quickly, and that exports are an important component of this expanding market.

I would like to agree with some of the comments made earlier, that we need to use as broad a definition as possible of environmental industries, because clearly we are talking about much more than simply pollution control. We need to be talking about pollution prevention more widely, and indeed redesigning many different facets of the economy, from transportation to energy and so forth, toward sustainable technologies.

So I have given in my written testimony examples of cases where renewable energy technologies have been successfully exported, from wind turbines to photovoltaics. As we think about what this national program will include, we do need to make sure that we define its parameters rather broadly.

Foreign investment also offers, of course, gains in this area, and again, in the debate over trade and the environment we focus quite a bit on the potential for negative effects, such as pollution havens along the Maquiladora zone and so on.

I try to point to some of the positive effects as well. To give one example, General Electric has recently entered into a joint venture with the Tungstrum Corporation to create energy-efficient light bulbs in Hungary. We need to think about how we can provide incentives for a green investment.

Services is another area of potential growth in environmental industries, from engineering firms to consulting firms and so forth. And indeed, the NAFTA as well as the latest Uruguay Round do include environmental industries in their provisions on services.

Finally, I would just like to comment a little bit on the proposal within the context of the national program that you outlined, to consider including provisions to promote environmental technology transfer within the context of a side agreement to the NAFTA. I definitely think this is an idea worth considering.

In some measure, it would go quite well with a proposal by Senator Baucus to include an environmental consulting function within the mandate of the proposed North American Commission on the Environment.

It is clear that as Mexico tries to meet its stepped up environmental obligations under the NAFTA and under the side agreements to it, it is going to need quite a bit of assistance, both financially and technologically.

In summary, it is important to remember that trade must become a vehicle for promoting the products and technologies that are going to help ensure ecological health rather than those that undermine prospects for an environmentally secure future. I believe that the national program that you have proposed could be an important tool for doing this.

Thank you.

[The prepared statement of Ms. French can be found at the end of the hearing.]

Mr. Studds. Thank you.

Mr. Eder, Vice President for Public Affairs, Oregon Graduate Institute of Science and Technology.

STATEMENT OF NORMAN R. EDER

Mr. Eder. Thank you. Mr. Chairman, Members of the committee, it is a pleasure to be here today.

Today you have heard a lot from my new colleagues on the panel about the promise of environmental technology, both as a domestic and as an export industry. No pun intended, but it is clearly a market that you may not be able to quantify, but you can see it and smell it readily around the world.

Sorry about that.

What I would like to do—I guess it is appropriate is that I am the final speaker—what I would like to do is talk about an infrastructure question that has only been discussed indirectly today by the panel, and that is the development of strong research, development training, and information infrastructure to support the growth of the industry on the world stage.

Let me begin with a quick definition. The environmental technology business is built upon knowledge and its innovative use. In many cases it represents one of the best examples of a buzz word of the 1970's, an information age industry.

When you think of environmental technology, don't just think of bulldozers, electronic gadgets, waste treatment plants. It is all of these things but it is also a lot more. It is planning, it is development of testing, monitoring and remediation strategies, it is metallurgy, high-performance computing, advanced manufacturing techniques, biotechnology, education and training, and a whole lot more. I even regret to say it is lawyers and public policy experts.

All of these elements in our economy, in our society, are playing a role and have a role to play in the growth and development of the biotechnology industry. It is both big business and one-person consulting shops.

Oregon is a leader in the development of this industry. Today the members of the Oregon Environmental Technology Association—Mr. Gene Davis is in the audience somewhere, he is a board member—represent over a hundred Oregon-based companies, and accounts for 2.8 percent of Oregon's gross State product. Nationally the number is estimated to be 2 to 1 percent.

Oregon companies are very export minded, and the industry is deeply involved in Oregon's efforts to develop specific markets for products and services.

My own institution has played a strong role in developing the knowledge base infrastructure that is so critical to the growth of this young industry. Through our concentration on applied science and problem solving, OGI, which is a private graduate university in the sciences and technology, is engaged in a large number of research and development projects that are helping the industry to succeed, not only in Oregon but around the world.

OGI is also turning out multi-disciplinary engineers and environmental science professionals who are taking the latest in field techniques in scientific assessment with them when they enter the environmental technology work force.

We are very pleased the committee is giving consideration to strengthening this infrastructure, in which we believe we play a small but substantial role, through the creation of a network of regional environmental technology centers. I would like to offer just a short list and by no means complete of things that these new centers could and perhaps ought to do.

The centers should emphasize hands-on activities, not ivory tower research—something very difficult for a university person to say. Their staffs should be mandated to provide information about available technologies, services, techniques, and assist firms who master these in the identification and development of foreign markets for their products and services, and also domestic markets.

The centers should be the home to joint technology development and testing programs that cross engineering and disciplinary boundaries. The centers should be established on a regional basis to respond to regional needs, but be administratively coordinated and linked electronically to each other so as to serve as a combined national resource.

I believe university-based scientists should have a role in these centers and funds should be made available for their involvement and integration.

A unique feature of the centers ought to be a service and technology certification program. There is a lot of snake oil out in the environmental business these days. And the value of this third-party certification program will be a revenue-generating service for the centers that would be paid for by industry, much as in other industries. But it would also serve the long-term interests of the industry as it seeks to develop new markets for its services.

We are confident that such a model would both be practical and successful, and I think our own experience at OGI bears this out. Five years ago, Oregon began a course for the development of this industry. OGI took that role on as an academic institution. We have developed a number of projects around the development of the industry that have been quite successful, and I have mentioned these in my written testimony and would be happy to comment on them later.

Thank you.

[The prepared statement of Mr. Eder can be found at the end of the hearing.]

Mr. STUDDS. Thank you.

We thank you all.

Let me just observe the lights will apply to the Members as well. We will have several rounds of light.

Let me start with a general question to you all. It is very clear that we have a worldwide problem that cries out for solution. It is equally clear that to a large extent the means of responding to that problem exist within our own borders.

To the extent we do that we accomplish two major goals. We make this a better planet for all of us, and we encourage the development of profitable enterprises.

It is very clear also that the new President, and particularly the new Vice President, are very well aware of this, have talked about it on numerous occasions, and intend to seize the initiative to try to deal with both problems simultaneously. It is a theme of what they both have to say.

I have recognized earlier that most of the principals in the Cabinet are not yet in place. It is difficult to produce a full-blown administration policy. We don't anticipate that yet. But the question before us now, in cooperation with the administration as its personnel fills in, is, What is the proper role of the Federal Government in this whole process?

The mind boggles at the list of agencies that already allegedly are doing something to help. Working groups, God knows how many of what kind and how many departments and agencies have within their general marching orders the requirement to assist in the export of American businesses. Obviously we are not doing it exactly as we could.

Equally obviously, from what we have heard, the other nations, particularly I gather the Japanese and the Germans, may well be ahead of us in recognizing and beginning the initial steps to seize the moment for their own industries.

The question obviously is, What should we do? And this being a legislative body, what if anything is necessary by way of Federal legislation? Should the role of the government be that of a catalyst? Should there be some kind of a partnership here? Do we need new institutions, whether within existing agencies or outside them? And what is the role of the government?

What—given the array of experience and background that you bring to bear, all of you—what should this committee be focusing on next as we begin to get our teeth into the legislative process? And you can go in any order you wish.

Mr. Connors.

Mr. CONNORS. Mr. Chairman, accompanying the invitation to testify was a list of questions. I think that it is our experience and as we can transmit it because we have spoken to so many people around the country and in other parts of the world. We were at the Earth Summit in June in Brazil as well. We need to get the government in some fashion coordinated, and the industry organized in a more effective way so that the government and the industry can develop joint strategies for penetrating the market opportunities that exist out there.

A step was taken last year in the Export Enhancement Act to create the new committee around environmental exports, and the expression of national policy in that Act is very helpful. But somebody forgot to put the industry into the committee makeup, so that the industry representatives are at the table. That will be a helpful addition.

It seems to me also that the role of that committee should not just be information sharing among the various participants from EPA, U.S. AID, and the other agencies enumerated, but it should be an active agency that has a responsibility to get something done, because that is what is needed.

We need to get an active Commerce Department program rolling in this area. While the Export Enhancement Act is useful, we think there ought to be a person at the highest level in the Commerce Department designated to help grow this industry.

The Export Enhancement Act, the support for the Newly Independent States, committed, with your assistance, in the Freedom Support Act are the resources to create American business centers in certain of the former Soviet Republics.

We think that legislation should be examined, and the idea of environmental business centers that you incorporated in this legislation could be expanded if it proves successful there to other regions of the world.

The world needs what we have to offer, and people in other countries want to do something with us in a commercial sense.

Now, I passed by in my original statement one of my favorite ideas, which is the notion that in the United States there are extraordinary numbers of experienced environmental professionals who I think would love to have the opportunity to be of service in other nations of the world in much the fashion that Peace Corps volunteers are.

I don't have in mind Peace Corps service—like my son and daughter-in-law serve in Kenya at the village level making sure there is water or wastewater facilities. I have in mind experienced professionals that can be of assistance at a pretty high level in government or industry or more governmental organizations.

Maybe this could be done by the Peace Corps or by a nonprofit organization. There are a lot of talented people in America looking for opportunities to be of service in this era because people realize the planet has a serious environmental problem. And we have got the skills and knowledge to be of service.

Mr. STUDDS. I have no more time to ask questions but you certainly have time to respond to that.

Mr. Campbell.

Mr. CAMPBELL. Mr. Chairman, while we were in Turkey running this pilot project, we had an unusual thing happen. We had a young lady address the group. She was the Turkish equivalent of a Girl Scout. Previous to that time, we had had some trouble with the Turkish industry recognizing they had a problem.

She was all of 10 or 12 years old, and she addressed the whole group, and she said, "I can't go swimming in the Bay of Izmit out in front of this hotel. I can hardly walk by it because the odor is so strong. When are you going to do something about it? What are the programs?"

And she actually had gone to the university to prepare her talk, and she said, "This is what you can do, this is what you can do, and this is what you can do to change the whole tenor of the conference." We had a more receptive audience after that.

I think when you talk about it being a $300 million industry—billion dollar industry, it is going to be much larger than that, because there is an awakening happening in the developing nations, the same thing as we had an awakening happen in the late 1960's in this country. And that market is going to grow.

You have talked about essentially an environmental Peace Corps. One of the things they can do is work on education, helping people to understand the projects that they can engage in on a small scale as well as a large scale to improve their local environments, educating children, raising awareness. A lot of work can be done in coordination with environmental groups.

Why is this good business? The reason it is good business is because frankly we have a product we want to sell. We want to not only develop that product, but we want to also develop the market. And it is one of those great situations where developing the market is good for the world.

It has another benefit for U.S. companies trying to compete internationally. It balances the tables. We have had our goods being produced with an environmental surplus on those goods.

When they go out and they compete against goods from Turkey or goods from Brazil or Chile or Mexico, their goods are more competitive because they are paying the cost of controlling their environmental problems. They will pay the cost down the road. They will pay it in a very big way. But in the short-term, their goods are artificially less costly than our goods, and our goods are less competitive.

So it makes sense from every way you cut it, from the environment standpoint, from promoting an important U.S. industry where we have a technological advantage over the rest of the world, because we have been operating under the most strict environmental regulations in the world, and we have got experience on how to solve these problems.

And then finally, it is good for the balance of trade. It is good for other non-environmental goods, makes them more competitive, because we all have to play by the same rules.

Mr. Menes. Mr. Chairman, if I could just comment briefly on the question of the coordination amongst the agencies, it is referred to in my written statement, but take note of the Trade Promotion Coordinating Committee. One of the things that it did was to create a subgroup on energy, environment and infrastructure, and the purposes of these subgroups in the TPCC itself, or one of the purposes, is indeed to increase the coordination and cooperation and understanding among the different agencies.

I think particularly in this area, this was a new experience for many of the agencies from different directions, one in the case of understanding trade and what is going on, but also from the point of view of the Commerce Department, especially the International Trade Administration, acquainting itself with the range and activities of the industry.

Further, as I think you are aware, the Export Enhancement Act of 1992 mandates a committee of the same nature on the environment. The new administration is reviewing how to best carry out this mandate. As a matter of fact, it is looking at the whole range of export promotion and what we are doing in the national area.

I think in the coming weeks and months we will be formulating a more comprehensive strategy, but clearly the commitment is already there, and some work has already started. There has been some very good cooperation as a result of these working groups.

So I am optimistic that this will expand. It is an appropriate way, because the agencies have different roles and need to be independent and separate. But there are areas where they come together.

The best way to do that is under this kind of a situation where we can create hopefully a coherent strategy and get the best out of each group.

Thank you.

Mr. FERRIER. I would like to comment on what I feel is the direct answer to your question, what the industry, all those companies already existing, what will be the potential to grow the revenues and make more jobs.

First, information. Clearly they don't have the greatest information about the opportunities. The Department of Commerce I think does do a fairly good job. A lot of their data they have done, their reports of people on the ground, are available through the data bank that was mentioned, and we have accessed those.

We have called the people at the Energy and Infrastructure Office through our representatives here. They are helpful. But the whole department is not well funded enough or elevated enough to really achieve what is needed by the vast $270 billion market we are talking about today.

So I think they need that information. But to make that information, make it known that it is out there, the program needs elevating and coordinating. I think it is OK as it is, but elevated to a higher standard, and have a noteworthy person or a very high-level involvement in this group.

The second point related to that is promotion. The industry needs promotion. The comments about UNCED, clearly Japan had hundreds of companies there and government was paying for them. The U.S. just left it up to their individual people, basically, to go down there, and we had a few small companies with their little booths.

I think the government can help by promoting the U.S. companies at the various world events, whether they are industry trade shows, whether they are international environmental conferences and so forth, the government needs to play a lead role and there is tremendous potential politically as well for the U.S. and the international atmosphere to gain political capital by leading the example in cleaning up the messes of the past.

The third, more esoteric thing the industry needs is technology permitting reform here in the United States. I will cite an example before I tell what you I think needs to be done.

A client of ours is a remediation company; they clean up toxic waste sites. They license technology out of a laboratory, which is a fixation technology for mixed waste, low-level radioactive waste. They couldn't get approval for testing it anywhere in the United States. They tried for over six months. But they did get—the government of Germany was interested in having them test the technology.

So the government of Germany fully funded their test, brought the technology, developed by a national lab in the U.S., over to be tested in Germany. Now they are going to import it with the help of the German government back into the U.S. market next year.

It is an illustration of how our technology approval process of environmental solutions can affect our ability to meet all these objectives we are talking about. So clearly that needs to be looked at. EPA, DOE, all of them know this is a problem and are doing their best to address it.

So that, relating to that, that reform is very important. So our technology that we do develop and build here in the domestic market can be a major contributor to going forward. And I think the industry is waiting for government to act on that and make their development capital pay off for them in future markets.

Mr. STUDDS. I appreciate that.

I apologize to Members for the length of time this opening question has generated.

Go ahead, but I want to give other Members a chance. Go ahead, sir.

Mr. EDER. This will be quick. Over the last couple of years I have spent a lot of time in the Pacific Rim, specifically Korea. One of the things I have been very impressed by with the embassy in Korea is the direct relationship that that embassy has developed with American firms who want to do business specifically in environmental technology. But I think that is an exception.

I would urge this committee to urge the administration to ask the State Department to pay more attention to this area, because we have two areas of worldwide reach in this country. One is the military, and the other is the State Department. It is too often overlooked.

Mr. STUDDS. We will go to the gentleman from Maryland.

Mr. GILCHREST. Thank you, Mr. Chairman.

Mr. Ferrier, could you go into a little more detail about this business in, I think it was New Jersey, this environmental testing business. What were they going to test specifically, and what would be needed by the government to allow a little flexibility in the environmental regulations so that they can proceed?

I guess there are two other quick little thoughts. I think you said that we need strong environmental regulations to provide incentives to continue to be innovative and produce new technology, but we also have to be smart in doing that. And it seems that we have gotten faster at detecting toxic material in minuscule forms as opposed to creating the technology that can deal with that sophisticated detection. And we are almost stuck between a rock and a hard place.

Mr. FERRIER. The latter is a correct observation. Clearly our monitoring technologies are beyond the need of a lot of cleanup. How clean is clean is a very important question.

The companies I was talking about use a cleanup technology to stabilize and fix radioactive waste so it wouldn't cause any damage to people around it. It was a technology which would essentially encapsulate the radioactivity of a mixed waste stream and render it basically harmless to the people around it.

What usually happens in remediation technology—this isn't my definite area of expertise, but you can certainly get opinions on EPA how they do this—they have an approval process where technologies have to be tested to get into the market, to be accepted as an accepted solution for cleaning up a site to a certain standard.

Now, often industry is driven to remove all their liability. That is their main concern. So they will go to very expensive measures of incinerating or destroying and trucking waste off-site, whereas a lot of the cost-effective technologies are not getting to the market simply because they haven't been tested and approved enough and they haven't achieved approval level from various agencies, whether they are State or Federal, to approve them.

And what happens, also in control technologies as well, when the new technology comes up, and it is proposed to industry, for instance, or a government, there will be a brief feasibility study, there would be a feasibility study, and they won't implement the technology. It often takes more than a year for the technology to get applied to the solution.

What really needs to be done is streamlining the permitting process of new technology. That is what the government needs to promote.

Is this a function of this very committee? It might not be, but I think it is an important factor that we need to develop our international competitiveness so our mechanism internal to the U.S. environmental industry supports technology development which will be key technologies to export to the rest of the world.

Obviously our low-level radioactive technologies are extremely important when the Soviet Union is going to have the money to clean that up. It might not be until 2010 or later. If we don't have the technologies and the Germans have practiced those and improved those ahead of us, they are going to get that work.

That is my point about the domestic market. If we make sure our solutions are staying here and our solutions are the most advanced, we are going to be in a position to take those abroad. So as much as we look at the international market, we need to look at our own market and make sure our solutions are really the best.

Mr. GILCHREST. Ms. French and Mr. Connors, you both spoke briefly about NAFTA, and you both spoke briefly about the dangers—Mr. Connors, you are more positive than Ms. French—the dangers and opportunities dealing with Mexico as far as free trade is concerned.

Mr. Connors, could you describe the major obstacles we might have as far as Mexico as far as upgrading their environmental awareness so that when we become, I suppose somewhere down the line, free trading partners, their regulations will at least be similar to ours?

And Ms. French, if you could do the same thing, how we can overcome those obstacles with Mexico?

Mr. Connors. If I may, Representative Gilchrest, I think Mexico has some really superb environmental laws on its books. The 1988 general ecology law is an excellent piece of national legislation. In that program of environmental-legal development, there is a decentralization process underway right now. The enforcement and regulatory activities are being expanded by sending much work out to the States to perform enforcement at the local level. There is a lot of information on the major commitment the Mexican government and industry have made over the past few years in expanding their capacity to implement and enforce environmental laws. They have in my view good laws on the books.

They clearly have a commitment through the reorganization of the national environmental agency, now called SEDASOL. It is within the very senior levels of the national government, an agency committed to the subject, a new attorney general for the environment in place and committed to environmental protection.

The opportunities for the United States environmental industry in Mexico—and that is just the beginning of the opportunity, because much of the rest of Latin America is looking to us for help—is to assist them by building business-to-business relationships, joint ventures, partnerships, that can be used to assist industry in upgrading their capacity to implement their environmental laws.

Now, it is our responsibility and their government's responsibility to enforce whatever laws are on the books. I believe I see a very strong commitment from Mexico's government to do that.

Industry in Mexico, and as you may know, in Mexico as in many other Latin American countries, it is a requirement that companies belong to an association of industry, and we entered into at the request of CONCAMIN, the industrial trade association of Mexico, an agreement in which we would work with them on education and training, information and technology transfer, finding joint business development opportunities in the environmental sector so as to help Mexico's industry to improving their capacity, which they want to do, to comply with their environmental laws.

We have had extraordinary success in that activity with our companies and our Latin American committee connecting to companies in Mexico.

We must, it seems to me, look at the positive side of how we in America can assist countries in doing a better job on environmental management, by bringing our companies and educational institutions to the table to be of such assistance.

There are lots of other countries in the world where we can do the same things. We have projects going in Eastern Europe, Poland and in Asia. The world is full of opportunities for us.

Mr. Gilchrest. Thank you.

Ms. French. I think we largely agree really that there are tremendous opportunities here and that the NAFTA is going to be a vehicle that we can use in order to take advantage of these opportunities, in order to seize them.

Clearly Mexico has made a commitment already through the NAFTA process to the upgrading of enforcement in particular. Everyone agrees their laws are pretty good as they are written, but the problem is in the enforcement end of things.

Now, of course, this is part of a broader discussion, and I know you are going to be having more hearings on it as the weeks proceed, but there is quite a push through the discussions on a side agreement to the NAFTA to ensure that enforcement is improved in Mexico, largely for trade reasons, because it can be a trade disadvantage to American companies if enforcement is lax so that Mexican companies can in effect realize sort of a hidden subsidy through environmental damage.

So as the negotiations proceed over this side agreement and over the creation of the North American environmental commission that will be part of that, there will be quite a bit of discussion about harmonizing standards at a high level and at making sure that enforcement is pursued in all countries.

Now, Mexico is going to need help if it is going to be able to meet both these higher standards that may be developed, as well as the greater commitment to enforcement. And I think this is both a technological and a financial challenge.

The Institute for International Economics called last week in the study it released on NAFTA for the creation of a $5 billion fund for environmental cleanup just along the border area, because we have committed to, I think, an $800 million joint effort with the Mexicans to clean up the border area.

The money hasn't been appropriated, but in theory we are committed to that. But, in fact, needs are thought to be far greater than what was provided for in that border plan.

So, clearly, there are opportunities through these side agreements to see that the situation improves, and indeed, if we are going to be asking of Mexico dramatic improvements in their environmental practices, I think there is an obligation incumbent upon to us help give them the technological resources that will enable them to meet those commitments.

Mr. STUDDS. We do have a hearing on the 10th of March on precisely that subject.

The gentlewoman from Oregon.

Ms. FURSE. Thank you.

I think this question is to Dr. Eder and to Mr. Connors. I wanted to find out what you think we should more effectively connect or how we could more effectively connect our research capabilities and institutions to the development and marketing of these new technologies for the environmental technology industry.

How do we link those, connect those better?

Mr. CONNORS. One of the best things I have heard said on the panel this morning, as we were talking about subjects close to this, Representative, was Dr. Eder's comment that his institution is action oriented, hands on, being helpful, and not some exotic research activity for an academic institution.

I think that is terrific and exactly on point. You have inquired whether a research institute or technology institute might be organized and supported. We think that is a very desirable idea. It is patterned on the notion that Dr. Eder has advanced.

There is an extraordinary body of knowledge and skill that reposes in our academic institutions. And if we can create those partnerships, as we have created a partnership with the State University in Massachusetts, through Dr. Michael Hooker, industry and the academic institutions working together and understanding—we must understand what the needs are, then action-oriented, hands on, practical activities, such as we recently had bringing companies and government institutions from Mexico to America for training, that is how we can really be of great assistance.

We think that an institute described in the invitation should engage in several kinds of activities. One is it should work with Federal and State governments and the industry to make sure that we have a fix on the markets needs in other regions of the world.

Now, the U.S. ASEAN Business Council has done some very interesting work that I believe is a good prototype. You must understand the global need. Once you understand it, you must communicate to government and to industry, so that you can do something about it. This means you need a strategic plan. And if we engage in a strategic plan, I think we will accomplish great things, if it is hands on, and practical, and is followed up.

There is one final thing the institute, a nonprofit organization, might do. Frankly, sitting at this table, I think are the experts on the environmental industry. There are some others around the country, but it is a very small group of people who understand this industry. And Grant Ferrier and myself and a few others, that is it.

We need a much better fix on this industry and its capabilities. And we need for that purpose to be sure that some institute, in cooperation with government and industry, does the work necessary to understand it. And in particular, we need to be sure that the various clusters are supported. Geographically the industry is located in certain places in the country. I have included a map of the industry with my testimony that is based on Grant Ferrier's data. I am not sure even that Grant has yet seen this. We need to be sure these clusters are supported, the government is engaged, and the industry is engaged.

We are very much influenced by Professor Michael Porter's analysis of the competitiveness of nations. He thinks internationally competitive successes by industry create the best economic opportunities. We think he is exactly right.

Our studies of the industry in the Northeast confirm what he says. He says there is a special role for trade associations and a special role for government. Our actual experience and the experience of the Oregon Environmental Technology Association directly confirms his analysis.

We have an industry which is internationally competitive if we can get it organized and get the government working with the industry. We have, as I said before, great opportunities.

Mr. Eder. Mr. Chairman, Representative Furse, let me give you two examples, I think, that address the question that was asked. The first is with regard to the hands-on projects. These are examples. I will try not to go on and on, but they are two I am very fond of.

The first is an example of a hands-on research project which is going to pay dividends well into the future. Portland has a closed landfill that was used for 75 years. Like all landfills it was put in what was heretofore thought to be wasteland, in other words, areas where there is lots of water and lots of wetlands. And that has been closed by the local authority, according to the latest EPA standards.

Recently we have signed an agreement with Metro, which is the metropolitan regional government in the Portland area, to use that site as a training, education and research site for the testing, evaluation and development of new monitoring and sensing and evaluation technologies, right on a site which is characteristic of thousands of sites around this country. And when I refer to hands-on research, that is exactly the kind of example that I would like to parade out as something that can be done.

I have about eight or nine faculty members at several institutions actually working on that program, and we are running postgraduate education programs, undergraduate education programs, and a high school program as well.

The second is a bit of entrepreneurialism, and that is that OGI as a private institution recognize the economic value of training and education. That has been referred to a number of times. I really would like to underscore that.

Training and education is absolutely critical to this knowledge-based industry. It is the element which is going to make the technology travel overseas.

About a year ago we began a process which has culminated in the signing of an agreement with the Korean national utility, the Korean Electric Power Research Center—it is the research center of the national utility—to involve ourselves in a training program. And they are sending their environmental engineers. We have had one and we will have more coming this spring to our campus for a five-month training session.

And we, for a flat fee, have offered them access to our campus, and they take courses on a noncredit basis, and do a whole bunch of stuff, including take a look at nuclear power plants for the region and generation plants, and a lot of things related to their interest.

This has already generated profits for OGI. But the value of it is that the people we will have on our campus from KEPCO are going to go back to their research center, and when they encounter a problem they have to deal with, they are going to come back to OGI, they are going to come back to the technology we showed them, and that is going to—that is literally an export industry that we see that we are engaged in.

Mr. Studds. The gentleman from California.

Mr. Cunningham. Thank you, Mr. Chairman.

I apologize to the panel that I have to leave. In my long quest to become an environmentalist, I got an emergency note here that says, "The trees did not arrive." My wife is a principal, and instead of trying to have a green day, we are trying to make all of our schools have a green day by planting trees. And the trees didn't arrive. They did arrive as I was on the phone. But we are making small gains.

As I have been sitting here, I am also on the Armed Services Committee and most of my life I spent in the United States Navy, but I was thinking on how this panel is working with the Chairman, and we can help you disseminate some of the information. You said that is a big problem.

For example, in the military, we have programs going on right now for environmental cleanup. The Navy is a representative all over the world of the United States. And what made me think is that I had a Navy captain—and I would like to pass it over to Mr. Ferrier, that did the Long Beach oil cleanup—he found a microorganism that ate the oil. We tried to get those on Navy ships so if they had an oil spill they would have it right on the scene.

Why couldn't we have the Navy, as representatives in ports in Korea, Japan, wherever we go, we are always looking for ways in which to coordinate with the host country, but we could set up an environmental program with that host country, and that would help you I think also disseminate the information.

Second, on the ship systems within the Navy itself, on nuclear systems, we have operated nuclear carriers and submarines for a long time. Those safety devices for other countries that are just getting started with nuclear power, it makes me think there is another area we could benefit and work with your interests.

The officer training programs, we have a leadership and management school. Why can't we in the services, not just the Navy, in our leadership and management programs, Mr. Chairman, have a program that deals with the environment?

And I say that because I was a pilot for 20 years. We have set up a program where we have a lake where kids were swimming in hydraulic fluid and oil, that is running into the lake, but that has now been converted. The pools now have shrimp; we have set up classes for kids. Every sailor that comes through there is getting a lecture on how to save the planet.

I think there could be a joint task force. I would be more than happy to work with you on something like that.

Mr. Ferrier. I think your point is very well taken. It brings to mind a possible opportunity for combining Navy projects with the concept of having environmental business centers worldwide. That is obviously one of the things I think about in terms of promotion.

You need to have centers demonstrating U.S. environmental solutions. You used the example of bioremediation, which is a very fine way of cleaning up a lot of the Navy type waste. A lot of them are fuel spills where they have got carbon type waste. Bioremediation is a very safe way of treating that. It takes a couple of years but it costs a tenth as much as digging it up with tractors and taking it off and incinerating it.

I think what you bring up, which is a very good strategy, might be to use DOD facilities around the world, Navy, Air Force, so forth. Some of those can be informative environmental technology demonstration programs. In other words, a cleanup could be a bioremediation demonstration project where three developing companies in the area could participate.

Mr. Cunningham. I am just thinking of ways——

Mr. Ferrier. The infrastructure is there already. You have got the personnel there who could cooperate with industry to make that effort.

Mr. Connors. Mr. Representative, we are——

Mr. Cunningham. Just Duke. Duke Cunningham.

Mr. Connors. We are keenly interested in the idea of establishing environmental business sectors in various key markets in the world. That is why the Freedom Support Act amendments that the Chairman supported last year are so important and so significant.

It seems to me it would be a terrific idea. If facilities are available that are appropriately located in the markets that are now military facilities—such centers could be established there.

I have a major caution about such centers. They have got to be staffed by people who know what the environmental industry is. You can't have them staffed by people who are, you know, not experienced or knowledgeable.

Mr. CUNNINGHAM. I would agree with that. We would ask for aid in that.

Mr. CONNORS. You have to have people who understand important segments of the industry and the technology and have contacts in the field.

Mr. CUNNINGHAM. Mr. Chairman, we did that. We had members of the Sierra Club and the environmental organizations come in. See, I did work with the Sierra Club, Mr. Chairman.

Mr. CONNORS. It is important to get the business experience brought to bear. We have experienced nautical, and maritime academy also working on export promotion. We have a vessel; they do a training mission every year. They went to Mexico and we had a series of environmental business conferences and seminars in connection with that visit in Mexico. They were very successful.

Why don't we take those maritime vessels and turn them consistently around the country into export development facilities. There are other maritime vessels that could also be used for that purpose around the country..

Mr. CUNNINGHAM. In the interest of time, for the whole committee, let me cover a couple of other points and I will be real brief.

I see especially in California, the biotech industry—I think when we are looking to serve as a model for other countries, we have things that will stop us. The Mojave Desert program where they deal with nuclear energy, they need disposal of that. Those are things I think we have got to work together on if we have an industry that is going to help us, but we are still preventing it, and I would ask help on that thing.

Whereas, also in San Diego, another area I can think of where we are being limited—I am sure Mr. Ferrier is associated—were the sewage problem we have, EPA says we have to begin secondary sewage treatment, but yet the Sierra Club said we don't need that because it is going into the ocean. These are stop gaps. Maybe we can set up and prevent some of our own barriers and at the same time help overseas.

With that, the problem of Mexico, my old district bordered Mexico, and the Tijuana River. We couldn't even stop the flow of the water coming down the Tijuana River because we had endangered species and we didn't want to build a water storage area.

I had to work with Mr. Gunaji of the IBWC to where we rediverted that, which the Sierra Club did not know about, and we went around them to do that. But in the long run, we were able to clean that up.

And I know the sewage plant, where you are talking about, the joint partnership with Mexico and ourselves, we are building a secondary sewage plant down there for that.

Those are things we can do. I think when you are working with Mexico—I have met with President Salinas. They do have good laws on the books but they don't enforce them. But they have moved I think in this last year faster than they ever have before. They are not shipping to the United States pesticides that we don't approve. And we have a lot of produce, the oil plants, they have tried to clean those things up, the Maquiladoras, all of those are areas we can work in.

But I think there is a lot of room in which this committee and yourselves and your industry could work together. And I would like to take part in it.

I would thank you for your testimony.

Mr. Studds. I thank the gentleman.

The long-suffering gentlewoman from California.

Ms. Eshoo. Did you say gentlewoman?

Mr. Studds. It is just a convention.

Ms. Eshoo. Thank you, Mr. Chairman.

I don't think there is any doubt in anyone's mind here that the opportunities are endless, absolutely endless. It is how we are going to seize them and make them work. And you have provided such outstanding testimony and touched on so many of these things. And since I am last, I am going to try to take into consideration the questions that have already been asked, and the answers that have already been provided.

One of the key environmental technologies is the equipment that measures. And we have that within our capability already. There isn't any question about that.

I mean, if you can't monitor the cleanup, you don't know how well you are doing at repairing the environment. But we know we have the tools that measure, and this kind of equipment is not all that expensive. The companies that manufacture it make quite a few relatively small sales.

I am interested in the smaller companies that do this. It fits with the President's economic package, the tax policies, because we need to link all of these things together. They are not separate things. Even though this is Merchant Marine and Fisheries, those policies have direct linkage to what we are doing here as well.

These companies, as I understand it, run into problems when they approach the Export-Import Bank. As I understand it, they are willing to do the loans for the much larger sales rather than the much smaller ones. I think we need to be able to get our act together here so that we can indeed produce the kinds of things that you are talking about abroad, wherever that is.

How can we address this problem? Do you have any ideas about it? Do you think that I am on target with what I am saying? Do you think it is incorrect? If it is, say so. If you think it is correct, how can we get at it? Whoever would like to take it.

Mr. Menes. Let me address in particular the last element of your comment regarding export financing. This is a competitive sector. We don't see it so much in our trade statistics environment as we do in measuring, controlling instruments, in terms of trade and standard industrial classifications, it shows up in other places.

Ms. Eshoo. Can I just stop you there? I don't understand what you just said, what you meant.

Mr. MENES. Statistically it gets labeled. For example, a lot of that is under the general category of SIC, Standard Industrial Classifications, 38, which is scientific, measuring equipment, but all kinds of things are mixed in there together, things that control manufacturing devices, things that measure.

And when you collect trade statistics at the border, you can't differentiate between what the end use of these objects are. That is why we don't have very developed data on this area.

If you look at our industrial outlook that we publish every year, we have a chapter on the environment, but there is no data in it. It is not because we don't want to put any in there, but when we go to the Census Bureau they can't produce it. It is a long, complicated problem.

But in any case I think we have long recognized at the Commerce Department that financing is a major impediment for the small and medium-sized firms. We have had long-standing discussions. There has been quite a bit in this area with regard to export finance and also the TPCC I mentioned earlier.

Of course, one thing to keep in mind, the Export Import Bank is not designed to make small loans of a short duration. They basically provide guarantees in this area.

Part of the problem is the banking industry in general in the United States that has been less active in the international trade area, because they find it is more profitable to do other things like credit cards.

It is a complicated solution involving both having the guarantees, which the banks need, but then the institutions willing to make the loans. There are a variety of things that have been worked on, and I think this will probably receive a lot of attention, because anybody who looks at the export problem generically and looks at immediate size and sometimes larger firms say, there is a big financing issue. The government can't provide all the financing and shouldn't, but there needs to be a way to ensure that the private sector is there.

There is quite a bit going on, but I suspect that will be a major item in this new administration's review how to solve that problem.

Ms. ESHOO. Are you suggesting that if in fact the policy direction and the emphasis of that policy changes, that what I am bringing up would be affected? Is that what you are saying? Or that it can't be, or——

Mr. MENES. I am saying it can be affected. It is not just a question of putting more money in the export financing bank, but rather finding ways to get the private sector back into it, finding ways to make the process simple so that the transaction costs aren't so high, so that the small firms can get financing. That has been worked on, but I believe that this administration will recognize right away that it is critical to the exporting equation.

Ms. ESHOO. Thank you.

Mr. CONNORS. Representative Eshoo, the issue of export financing and export development as compared to export promotion is really important in this area. Two sources of information, one is a book by Brookings that just came out, "Going Global: How the European Countries Support Export Development," and the Office of

Technology Assessment has under way right now a study that will at least look at some of these activities, maybe not as a primary purpose of the study, but they will be looking at export development.

We think that it is a function of national and regional environmental business organizations to directly develop partnerships between States and economic development and trade offices and the industry to help small and medium-size companies go abroad. Most companies don't know how to do it. They are afraid of it. They just need a lot of help.

And that is different from bringing them to a day-long conference and saying there are great opportunities here or there. It is a much more complicated project, and that is also a role for the institute we have talked about.

Ms. ESHOO. May I ask one more question?

Mr. STUDDS. Certainly.

Ms. ESHOO. Maybe it is more of a comment. One of the biggest complaints we hear in this area is that, on the one hand, there is the willingness, the recognition that this represents one of the greatest markets to be seized, and not only marketed all over this country but all over the world, because of the needs that we recognize that are there. But our regulatory process and the approval of environmental technologies doesn't match with the rapid pace of technology.

Is there anyone here that can comment on that or give us some hope about a cross germination between the departments, Commerce, EPA, the timeframes that can be set up relative to the regulatory process that approves the technology and get it out there?

I hope I am expressing it or bringing to it the—both the frustration and the clarity with which I hear it from the people that I represent, which is Silicon Valley, by the way, one of the world leaders in this area.

Mr. CAMPBELL. I think this points out the need for one central area to handle this policy.

Ms. ESHOO. Exactly.

Mr. CAMPBELL. I think the Commerce Department, going back to Chairman Studds' question before, is an appropriate place for that coordination to occur. It is one of the few places in government where you have a trade organization and an environmental organization housed under the same roof. They have a lot of natural tension that exists between those, but it is the same tension that exists in business. And you put one person in charge, you don't have government by committee.

What we had at the Sao Paolo trade show was a government by committee. We had 30 percent of the exhibits as U.S. export promoters, environmental goods. Seventy percent was EPA and other regulatory agencies explaining how they regulate U.S. industry. Somebody missed the point. And so——

Ms. ESHOO. That was our first clue, right?

Mr. CAMPBELL. So we need someone who has broad authority, who can coordinate these efforts.

You struck upon a key problem, and that is financing. You have to have some influence over the finance policy and the approval, technological approval process, in order to be able to bring this thing into a coordinated, cohesive, recognizable policy.

Ms. Eshoo. Thank you.

Mr. Connors. Representative Eshoo, on pages 10 and 11 of my testimony there is a section on technological competitiveness, and EPA has completed two studies recently that are directly responsive to your question. The first is a study on how our State and Federal environmental regulatory system has constructed barriers to technological innovation. They came up with a number of recommendations. I have recited on page 10, and following that, once you have technology innovation, you must diffuse it. So they have recently completed a study on technology diffusion, published in October 1992.

Those are good places to start. But we have got to be sure we have financing so that the technology can be developed and delivered to other markets in the world.

Mr. Ferrier. I would like to add one point relating to that. Clearly, financing really has to be looked at as a product for the international environmental industry. The money to do it is a major concern.

Obviously, Eastern Europe doesn't have the money to clean up their problems. And Ex-Im Bank probably focuses more on big projects like wastewater plants. They might not be able to help a small company get abroad. A U.S. policy centered around this committee could help small environmental companies go abroad.

Representative Furse was talking about getting technology into the market. This is reiterating a point I made before, and I will cite some numbers.

The world industry is now $270 billion growing to more than $400 billion in five years. That represents about $300 billion of new revenues over the next five years from the industry.

Now, 90 percent of that is going to be stuff that we already know how to do. There is no problem. Our companies can do it. Our companies are doing is it here now.

And the key will be getting those people in the door, like my other colleague said, in programs like we have been suggesting, getting those companies, letting them know where the opportunity is and getting them in front of the doors and moving the business, making those relationships. That is how the government and this committee can facilitate the industry representing it, to get our companies in the right place at the right time as this market evolves over the next 20 years.

Mr. Studds. The Chair would like to recognize the gentlewoman from Oregon.

If you will assume the Chair for a moment while I make a phone call, then you can determine whether or not the gentlewoman from Arkansas will yield to you.

The gentlewoman from Arkansas.

Ms. Lambert. Thank you, Mr. Chairman.

I certainly appreciate having this opportunity to further examine our government's efforts concerning envirotechnology management. I think we all agree that we must do more to enhance business's ability to participate in this rapidly changing worldwide industry.

I am pleased to have heard many of you speak on education, and education being a very important part of that. I know in my own State of Arkansas, we have recognized the need to adapt to this relatively new enterprise.

At the University of Arkansas, one of our newer endeavors is the enviro-science major, which is currently being evaluated, along with countless other minors in environmental management, and some other areas, agricultural waste management and plant protection management.

So our schools are recognizing the need for education in these areas, and now we must provide the corporations with the tools to get bright citizens to compete in the changing global economy.

Mr. Eder touched on it a little bit. I hope I am not redundant. But I am very interested to know, the educational part of it, how we can incorporate that. There is a great deal of the future that needs to be addressed. I think we can do that through education.

My question is, we have got a great deal of cleanup to do in our own nation, and it is important, I guess, sitting on another Subcommittee of Transportation and Hazardous Materials, having worked on Superfund, Clean Air and a lot of these others, is there a more active role that you all can play in the cleanup aspect, in learning pollution prevention by cleaning up?

You certainly understand better how not to do something when you are cleaning it up. Is that a role that you can play, that you already do play, that you could probably enhance, because if we are looking for financing and funding we are going to see more of that for the cleanup of the accidents and certainly the danger situations we have already gotten ourselves into. And maybe that would certainly be a way to publicize the efforts you all want to make, is through the cleanup process, teaching how to avoid the situation we have gotten ourselves into in the first place.

Mr. CAMPBELL. Congresswoman Lambert, what we have done is gone to school. It has been a very expensive learning process, but what has happened is we have participated in a 15-year-long cleanup process, and we have learned from our experiences.

Don't mistake this market as being all hardware and equipment. A very large portion of this market is experience, people who have gone in and tackled some of the most difficult environmental problems in the world. And we have begun to see some progress.

So we can take that know-how and go to other countries. But we face an education problem with the developing countries.

I will give you an example. We were in Izmit, Turkey, and you have the Bay of Izmit out in front, and we are talking to the municipal officials, and they are convinced the Bay of Izmit cannot be rehabilitated in any meaningful way.

But we have got example after example, one that runs right across the front of the Capitol here, the Potomac River, where we have seen bodies of water be able to be reclaimed and reach some of their original abundance.

So we have to educate these government officials in other countries to know what can be done. Then we have to be educated ourselves by them about what they think they want to do.

So somewhere there has to be this nexus, and Congressman Cunningham suggests that the Navy might be a place for that nexus to occur. That is one appropriate place.

The Commerce Department, usually ITA and NOAA, is another appropriate place. We have got to bring in the Ex-Im Bank. They have got to be part of this process to financing new projects, make it easier, kind of explain to the small and medium-sized companies how to do it. It is a medium-sized company business. That is who is running these cleanups. It is not mega firms. There are mega firms, but the majority are medium sized. And they have trouble doing the market development. They have trouble going abroad often.

But if opportunities can be provided, if the package can be put together by the government, then they can participate, and you are going to see some significant export of U.S. know-how.

Ms. JOSEPHSON. If I could extend on that answer, Representative. In my testimony we have about 12 examples of education and training efforts that we are engaged in. We have sponsored joint institutions. We have foreign students conducting research in a post-doctoral program. We are coordinating coastal resources management training in Nairobi. Through the WMO, we are training people around the world in meteorology and those environmental aspects. We are involved in satellite applications, sponsoring workshops through the United Nations in various countries. The list goes on.

So in all our areas we are actually engaged in trying to transmit the know-how we have and the technology we have to other countries. And of course since many of the technologies are carried out by U.S. companies, we are, in essence, helping to create markets for those products abroad.

I think this is an area where agencies such as ourselves are using government money to fund the development of prototypes, test them, use them in our own programs, and create markets both here and abroad for our companies.

Ms. LAMBERT. Maybe I am not understanding completely, but I think that is tremendous and it is a great way, but what I also seem to be hearing is that there is a need for financing, that there is an area where you are looking for—and I think maybe the marriage between some of the areas where we have not been capable of doing the proper cleanup could be areas in which to incorporate the smaller businesses.

I look at a closed air base in my district. It can't be sold because of the environmental liabilities. It would be great to establish an environmental cleanup prototype, testing ground in something like that, which would afford some of the smaller businesses to come in and teach people how to do some of those cleanups on an area like that.

There has got to be firm money for that, especially in the Federal facilities, looking for areas like that where there is money.

Mr. CONNORS. Representative, there is a lot of experience in the defense industry on systems implementation. I don't think we have used systems analysis and systems strategies enough in the hazardous waste area. One initiative in defense conversion might be to look at that area.

With respect to the pollution prevention, I think that my colleagues on this panel would agree that there is under way in the United States and in other nations of the world a whole lot of activity to prevent pollution for two reasons. It limits liability, which as a lawyer I have to advise clients to pay attention to; and the second is, it is cost effective.

There is a process going on right now of the environmental efficiency movement, which is the latest trend in corporate environmental management. Some of the recent publications—the Columbia Journal of International Business published a marvelous book on this subject. The Business Council for Sustainable Development book, Changing Course, prepared by CEOs for the Earth Summit, focuses on cost savings and liability avoidance. I think that word is getting gradually through the consciousness of managers of industry around the world. Not local industry, always, but a lot of the multinationals certainly are.

Ms. Josephson. Another area of financing you might want to explore is the financing available through AID, which does finance the exportation of environmental technology along with other technologies around the world.

Mr. Connors. We think also it is very important that the environmental industry develop close relationships with U.S. AID, and whatever its successor agency is to be called. It is important that that relationship be developed and strengthened because it will be a different relationship than the relationship that we will develop with the Commerce Department in regular commercial export activities.

We also need to be sure the multilateral lending institutions are connected to this industry, so that they can take advantage of our competence and experience.

Mr. Menes. Mr. Chairman, could I add one very quickly, the U.S.-Asian environmental partnership, which is co-chaired by AID and Commerce, involves this kind of arrangement. One of the things is putting environmental specialists to the Foreign Commercial Service funded through AID in non-Asian posts as well as the Asian Development Bank, as well as bringing the private sector in and government. So these things are starting to develop and have a lot of promise both there and also as models for elsewhere in the world.

Mr. Connors. One brief comment in response, the program that he has described is a very interesting and exciting program, and I think a lot of its success is that there was a private business organization, the ASEAN Business Council, that is pushing and stimulating it, trying to get the parties together, but at least the government and business are cooperating, which I think is a great model for the future.

Mr. Studds. I am sorry to observe we are constrained to end very quickly, but Members, please, you have been very long suffering and arguably gentle.

Ms. Eshoo. I have never been referred to as long suffering. This is a new thing for me. Thank you, Mr. Chairman.

You mentioned AID. How much is AID actually doing? Isn't it $540,000 that was lent out? Are we tracking on the same thing? Someone mentioned that.

Mr. MENES. I couldn't give you an exact number. We could probably get some estimates. It is a lot bigger than that. This is just that Asian partnership is I think $5 million; $10 million over 10 years—$100 million over 10 years. So we can get you data. But it is considerably more than $600.

Ms. ESHOO. It is my understanding that the EC loaned out direct cash grants to Eastern Europe, and what they put out was some $70 million to date. AID put up $450,000. So I don't know if we are talking about the same thing.

Mr. FERRIER. That is one program.

Ms. ESHOO. Sometimes the words sound a lot better than what we are really doing. I think we need to improve it, coordinate it and actually make it happen. I just wanted to say that.

Mr. STUDDS. You are onto a great truth. Your long suffering has just begun.

The Chair will observe that it is interesting that the earlier version of this bill introduced toward the end of the last Congress was referred to two committees, this and the Committee on Foreign Affairs. Much of what we are talking about may turn out to be the case again.

We can go on all day but we don't have that choice. I want to observe the number of Members who endured the entirety of this hearing. That is unusual and I think it bespeaks both the importance of this subject matter and the interest of it and the expertise of the panel. I thank you all very much.

We now or at least hopefully soon have legislative work to do. Again, as I indicated at the outset, we await the filling in of all the relevant policy positions by the new administration, and we look forward anxiously to proceeding to work with them to develop legislation.

Each of you on the panel will be playing a vital role, both formally and informally, as we proceed in the next few weeks and months.

I want to thank everybody. This has been a source of very, very great interest and importance. You have been wonderful.

The committee stands adjourned.

[Whereupon, at 12:05 p.m., the subcommittee was adjourned, and the following was submitted for the record:]

ONE HUNDRED THIRD CONGRESS

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BACKGROUND MEMORANDUM

TO: MEMBERS, SUBCOMMITTEE ON ENVIRONMENT AND NATURAL RESOURCES

FROM: COMMITTEE STAFF

DATE: FEBRUARY 22, 1993

RE: ISSUES RELATING TO THE ESTABLISHMENT OF A NATIONAL PROGRAM TO PROMOTE THE EXPORT OF U.S. ENVIRONMENTAL TECHNOLOGIES, GOODS AND SERVICES

On Thursday, February 25, 1993, at 10:00 a.m in 1334 Longworth House Office Building, the Subcommittee on Environment and Natural Resources will conduct a hearing on the establishment of a national program to promote the export of United States environmental technologies, goods and services.

The witnesses will be Mr. John Menes, Acting Assistant Secretary for Trade Development, United States Department of Commerce; Ms. Diana H. Josephson, Deputy Under Secretary, National Oceanic and Atmospheric Administration; Mr. Grant Ferrier, President, Environmental Business International, Inc.; Mr. Donald L. Connors, Chairman, Environmental Business Council, Inc.; Mr. Tom Campbell, General Counsel, Entrix, Inc.; Ms. Hilary French, Senior Researcher, Worldwatch Institute; and Mr. Norman R. Eder, Vice President for Public Affairs, Oregon Graduate Institute of Science and Technology.

Background

U.S. industries have been at the forefront of research and development of environmental technologies in order to comply with domestic environmental laws. However, relatively little has been done to promote the export of these technologies to the expanding global envirotech market, although an aggressive export campaign would create jobs and provide a boost to the U.S. economy. The purpose of the hearing is to gather information on the potential overseas market for environmental technologies, and to determine what role the federal government should play in the development of that market.

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The Global Market for Environmental Goods and Services

According to the Office of Technology Assessment (OTA), the global market for environmental goods and services is large and growing fast. The envirotech industry includes end-of-pipe pollution abatement equipment -- e.g., water and wastewater treatment, stack gas scrubbers, solid waste handling -- plus engineering, management, and consulting environmental services, education and training. The United States is the world's biggest producer and consumer of environmental goods and services because of its size and strict environmental laws. It is also the second largest net exporter of environmental goods after Germany; Japan is the third.

There is expanding worldwide interest in "cleaner production" technologies that prevent, rather than control and treat, pollution and waste. Demand for cleaner industrial, energy, and agricultural technologies, as well as for green products, is certain to increase as concerns about global climate change, toxic substances, and other pollution problems continue to mount.

Demand for these products was also fueled by the Earth Summit, held in Rio de Janeiro, in June 1992. At the Earth Summit, 120 nations: (1) agreed to a Declaration of Principles guiding future environmental policies; (2) adopted an international agenda, called Agenda 21, establishing a comprehensive program for sustainable development; (3) agreed to a climate change convention; (4) adopted a set of forestry principles; and (5) except for the United States, agreed to a Convention on Biological Diversity. Japan, one of America's principal competitors for the envirotech market, had the largest display at the Earth Summit, clearly viewing the Summit as an economic opportunity for Japanese companies. As Vice President Gore notes in his book, "Earth in the Balance," the United States missed an important opportunity for promoting the U.S. envirotech industry by not playing a more active role in the Earth Summit. In the book, Vice President Gore recommends that the U.S. establish a "Global Marshall Plan" for the environment to protect the global environment and promote U.S. industry.

The Organization for Economic Cooperation and Development (OECD) estimates that the worldwide environmental market was $200 billion in 1990 and will grow at a 5.5 percent annual rate to $300 billion by the year 2000. The largest net exporters of environmental products, Germany, the United States, and Japan earn estimated trade surpluses of $10 billion, $4 billion, and $3 billion, respectively. Only about 10 percent of U.S. environmental production is exported, however, compared to 40 percent for Germany.

Additional envirotech trade opportunities will arise from industrialization of developing countries, reconstruction of Eastern European and former Soviet economies, demand for new and replacement capital stock within OECD, the North American Free Trade Agreement (NAFTA), and the commitments to technology cooperation made by the United States and other nations at the Earth Summit.

A major constraint in expanding environmental trade to those nations seeking these new technologies is the inadequate financial commitment made by the United States government to this new industry.

Unlike its European allies, the United States has not actively facilitated exports of environmental goods and services. According to a recent report from the Brookings Institution, entitled "Going Global," the United States has been slow to recognize the strategic importance of a coherent and aggressive export policy, in general. In contrast, Europe and Japan view export trade as an essential component of global competitiveness. The General Accounting Office reported that, in 1992, ten executive branch agencies spent $2.7 billion on export promotion, but their activities were not guided by any explicit strategy or set of priorities. Indeed, three-quarters of all federal export promotion spending was for agricultural exports, which represent only about ten percent of the value of all U.S. exports.

The State of the U.S. Envirotech Industry

There are approximately 58,700 envirotech companies in the U.S. that in 1991 had combined revenues of $120 billion. The U.S. envirotech industry has developed in response to strict environmental regulations in the United States, as well as health protection and disaster prevention policies. Currently the industry is centered in 10 to 15 regional clusters around the country.

One such cluster is centered in Massachusetts and New England. The Environmental Business Council, Inc. (EBC), formed in 1990, is a consortium of 200 environmental and energy firms whose objective is to foster the development of an effective and competitive envirotech industry and to enhance and maintain a clean and productive environment. The EBC has recently entered into a cooperative agreement with Mexico's industrial trade association, CONCAMIN, to assist Mexican companies in the implementation of modern environmental management through information transfer, educational programs, training, and technology cooperation. One way of assuring that Mexico does not become a "pollution haven" for U.S. businesses as a result of NAFTA -- a concern expressed by many environmental organizations -- is by building the capacity of Mexican companies for environmental compliance and enforcement. By the end of 1992, close to $100 million in contracts for new business in Mexico had been committed to EBC companies as a result of its agreement with CONCAMIN. The EBC is working on duplicating this initiative in Canada, Latin America, Poland, and Eastern Europe.

Similar associations of environmental businesses have arisen in other parts of the country. For example, the Oregon Environmental Technology Association was founded in 1991 to organize companies in the Pacific Northwest and to sell environmental goods and services in the Northwest and to the Pacific Rim nations.

In addition to the creation of regional associations, the private sector has plans to establish a national environmental technology trade association, with a presence in Washington, DC, and to host a conference on the envirotech industry later this spring.

The private sector is doing its share to participate in the world market for environmental goods and services -- what is the federal government doing to help out?

Organization of the Federal Government to Promote the Envirotech Industry

The federal government has no unified strategy or program to assist the U.S. envirotech industry. Instead, myriad departments and agencies have individual programs to promote exports. These include the Department of Commerce, the U.S. Agency for International Development, the Environmental Protection Agency, the Department of Energy, the Overseas Private Investment Corporation, the Trade and Development Program, the Export-Import Bank, and the Small Business Administration.

The Commerce Department is planning a new focus, however, on trade promotion and competitiveness. During his confirmation process, Commerce Secretary Ron Brown stated that the Department should be a strong advocate for American business and for policies that strengthen America's competitiveness. Secretary Brown added that the Department has a leading role in formulating trade policies, including promotion of U.S. exports, and must play a lead role in coordinating technology policy with an overall growth strategy. Finally, Secretary Brown indicated the Department also has a critical role to play in environmental policy, through the National Oceanic and Atmospheric Administration NOAA, including NOAA's role as an incubator for new environmental (including weather) technologies.

In his State of the Union Address on February 17, 1993, President Clinton stated that, on the edge of the new century, economic growth depends as never before on opening up new markets overseas. A part of our national economic strategy must be to expand trade on fair terms, including successful completion of the latest round of world trade talks, including NAFTA. President Clinton pledged that business, government, and labor will work together in a partnership for economic growth.

Related Measures from the 102d Congress

Congress began to consider legislation to promote the envirotech industry in the 102d Congress, but a comprehensive proposal was not enacted. At the end of the 102d Congress, Chairman Gerry E. Studds introduced H.R. 5895, the National Environmental Business Foundation Act, which was referred jointly to the Committees on Merchant Marine and Fisheries and Foreign Affairs. The Foundation Act would establish a public-private partnership to promote exports of environmental goods and services. No further action was taken on this bill in the 102d Congress.

The Congress passed the Freedom Support Act (FSA, Pub. L. 102-511) last year, which authorized $417 million for bilateral assistance to Russia and other independent states of the former Soviet Union. Part of the bilateral assistance would be spent on promoting U.S. environmental technology exports to the former Soviet Union. The FSA also authorized the establishment of a number of American Business Centers in the former Soviet Union to create commercial partnerships between the U.S. and the independent states. The American Business Centers would include Environmental Business Centers to promote exports of U.S. environmental goods and services. So far, the State Department has not developed a strategy for implementing the FSA, but President Clinton has recently designated Strobe Talbott as Special Advisor to the Secretary of State for the New Independent States and coordinator of the Soviet aid effort.

During the 1992 reauthorization of the Export-Import Bank, Congress, in title II of the Export Enhancement Act (Pub. L. 102-429), directed the President to establish an Environmental Trade Promotion Working Group to develop a strategy for expanding United States exports of environmental technologies, goods, and services. The Working Group would be comprised of representatives of several agencies, including Commerce, State, Treasury, Agriculture, Energy, and Transportation. The Secretary of Commerce is to designate the chairperson of the Working Group from among senior employees of the Department of Commerce. There is, however, no private sector participation on the Working Group, and the Secretary has yet to designate the chairperson or convene the Working Group. Given the central role the private sector must play in providing the envirotech exports, an argument can be made that the environmental business sector must be involved in the development of this strategy.

Proposed National Environmental Technology and Business Competitiveness Act of 1993

One purpose of the hearing is to obtain comments on a legislative proposal by Chairman Studds to establish a true public-private partnership for the promotion of the U.S. envirotech industry. This proposal is detailed in Attachment A. In summary, the proposal would:

* contain a comprehensive statement of national policy to promote the U.S. envirotech industry;

* establish a new Office of Environmental Technology and Business Competitiveness in the Department of Commerce, to be headed by an Under Secretary;

* authorize the Under Secretary to coordinate all DOC and federal programs that support envirotech exports;

* authorize the establishment overseas of additional American Business Centers, including Environmental Business Centers;

* authorize funds for a private, non-profit International Environmental Business and Technology Institute, to conduct assessments of overseas markets and link U.S. companies to those markets;

* create a Volunteer Environmental Services Corps, modelled on the Peace Corps, to provide U.S. environmental experts to foreign countries; and

* require, as part of a supplemental NAFTA agreement, that CONCAMIN and the new Institute conduct an assessment of Mexico's needs for U.S. environmental goods and services, and obtain a commitment from Mexico to acquire those goods and services.

Issues

* What is the state of the U.S. envirotech industry and what is the projected world market for environmental goods and services?

* How is the private sector organized to take advantage of the anticipated exponential growth in the world market for environmental goods and services?

* What are other nations doing to take advantage of these opportunities?

* What should the United States be doing to take advantage of these opportunities?

* What obligations does the United States have to provide environmental technology to developing countries under Agenda 21, adopted at the Earth Summit, and what is the U.S. doing to honor these commitments?

* How is the federal government currently organized to promote the U.S. envirotech industry?

* What should the federal government do to assist the U.S. envirotech industry?

* What trade barriers exist to providing U.S. environmental goods and services overseas?

* When does the Secretary of Commerce plan to designate the chairperson of the Environmental Trade Working Group and begin to work on the national strategy called for in the Export Enhancement Act?

* What plans does the Department of Commerce have to involve the private sector in the development of this strategy? Is legislation required to mandate this participation?

* Can the U.S. establish a working partnership between the federal government and the private sector as other nations have done to promote environmental exports? Should the environmental community play a role in this partnership?

* How can this partnership best be established? Is the creation of a National Environmental Business and Technology Institute the best way to do this? If so, how should it be established and funded?

* How many regional centers should be created as part of the Institute, and where should they be located?

* How can we assure that high environmental standards are met in the provision of U.S. environmental goods and services overseas?

* Should a new Volunteer Environmental Services Corps be established, and, if so, what should be its relationship to the Peace Corps?

Summary

The U.S. envirotech industry is developing a commanding presence in the United States. The worldwide market for environmental goods and services is growing tremendously. The U.S. could take advantage of this growing market by helping the U.S. envirotech industry sell its goods and services overseas. This will foster jobs here, plus improve the state of the global environment.

Attachment

ATTACHMENT

Proposal for a National Environmental Technology and Business Competitiveness Act of 1993

Elements of the legislation could include:

- a comprehensive statement of national policy to promote the U.S. envirotech industry;
- establishing within the Department of Commerce a new office of Environmental Technology and Business Competitiveness, to be headed by an Under Secretary for Environmental Technology and Business Competitiveness;
- authorizing the Under Secretary to coordinate all relevant DOC programs, including those of the National Oceanic and Atmospheric Administration in the support of new environmental technologies, including marine biotechnologies, weather technologies, environmental monitoring, and environmental remote sensing;
- authorizing the Under Secretary, in cooperation with private businesses, state agencies, and institutions of higher education, in one year, to develop the national strategy for the promotion of envirotech exports;[1]
- authorizing the Under Secretary to establish American Business Centers, including Environmental Business Centers, in developing nations apart from Russia and the newly independent states;
- authorizing $5-10 million for each of five years to support the activities of a private, non-profit International Environmental Business and Technology Institute, which would:
  - identify target country and area needs for U.S. environmental goods and services;
  - identify U.S. businesses to meet those needs;
  - assist industry on a regional basis in export development;
  - enter into contracts with UN agencies, the World Bank and multilateral lending banks; and
  - sponsor training and education programs for foreign nationals.

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[1] This will build on the strategy proposed in Title II of The Export Enhancement Act of 1992, Pub.L. 102-429, which was limited to federal agencies.

* creating a Volunteer Environmental Services Corps, modelled on the existing Peace Corps, to provide environmental experts to foreign countries and help staff the Environmental Business Centers;

* analyzing the need for tax incentives and low-cost loans to the envirotech industry; and

* requiring, as part of a side agreement for NAFTA, that Mexico enter into an agreement(s) with the International Environmental Business and Technology Institute for an assessment of Mexico's needs for environmental goods and services and acquire a specified dollar amount of U.S. environmental goods and services, based on the needs assessment.

Written Statement by Jonathan Menes
Acting Assistant Secretary for Trade Development
U.S. Department of Commerce
Before the House Subcommittee on Environment and Natural Resources
Committee on Merchant Marine and Fisheries

February 25, 1993

Good Morning. I wish to thank you for the opportunity to testify regarding the efforts of Department of Commerce to support the environmental industry.

There is no precise statistical definition for the environmental sector because it includes many diverse products, services, and technologies. The lack of a clear statistical definition makes it extremely difficult to estimate market size or trade. Thus, while I present various estimates drawn from a number of sources, they are not all consistent and should be considered only orders of magnitude. The estimates on market size and share used in my testimony are based on several sources including market studies compiled by U.S. Foreign Commercial Service personnel stationed at U.S. Embassies.

My presentation will cover the following topics and address what the International Trade Administration is doing to increase U.S. exports of environmental technologies, equipment, and services.

- **Structure of the Environmental Industry**
- **The Global Market for Environmental Technologies, Equipment, & Services**
- **U.S. Competitiveness**
- **The Department's Role in Supporting the Environmental Industry**
    - **International Market Development/Export Assistance**
    - **Environmental Policy Support**

Structure of the Environmental Industry

The environmental industry is composed of distinct subsectors which reflect the major environmental legislative initiatives enacted over the past 25 years. These subsectors include the industrial air pollution control sector, municipal solid wastes, hazardous wastes treatment disposal, municipal and industrial water and wastewater treatment, resource recovery & recycling, and the emerging pollution prevention industry sector.

The number of U.S. companies--consulting, engineering, design and manufacturers of equipments and integrated systems--is conservatively estimated to range between 7-10,000. There are many more companies, some consisting of one entrepreneur, which we do not include because the Department's objectives in the export arena are to assist companies whose financial resources allow them to take advantage of commercial opportunities in world markets. We have found that very small firms whose income is in the low six figures concentrate primarily on the domestic market and do not have the resources to take advantage of international opportunities. Nevertheless, we make every effort to reach out to all firms who may have an interest in overseas markets through established industry associations, trade press, and other organizations to alert them to business opportunities.

The Global Market for Environmental Technologies, Equipment, and Services

The Organization for Economic Cooperation and Development published a study in April 1992, The OECD Environment Industry - Situation, Prospects, and Government Policies, which estimated the global market for environmental technologies. The report, the only comprehensive study to our knowledge, noted that markets for environmental technologies were about $200 billion (1990) and are expected to reach $300 billion by the year 2000, possibly exceeding the aerospace industry. These figures include expenditures for equipment, systems, and physical plants, and services. Currently, 85 percent of this market is found in OECD member states. The United States has 40 percent of this market -- or about $70 billion. The OECD forecasts this market to grow at 5 percent annually through the decade's end. However, growth rates in countries and regions which are experiencing rapid industrial growth and the attendant environmental problems accompanying expansion are expected to witness growth rates nearing double-digit figures. Regions where growth in the demand for environmental technologies is expected to increase substantially are the ASEAN Region, Eastern Europe and the Newly Independent States of the Former Soviet Union, East Asia/Pacific Rim, Mexico, and Latin America. Growth rates in the OECD countries will range from 2.2 percent (Denmark) to 7.percent (Portugal) with the United States falling about in the middle at a 5.5 percent annual growth rate.

The environmental industry in the United States evolved as a result of the enactment of strict environmental laws and the enforcement of strong regulations which triggered investments in research and development of environmental technologies, led to the commercialization of new technologies, and created a market demand for environmental equipment, systems, and services. The result has been that the United States environmental industry is one of the most competitive in the world. In addition, the United States has committed a significant amount of public funding for environmental clean-up.

The typical indicators which we look for at the Department of Commerce to assess developing market opportunities for the U.S. environmental industry are similar to the factors which have caused our own industry to evolve. When political pressure creates the climate for a foreign country to enact stringent environmental legislation, and resources are allocated to strict enforcement, there is great potential for the export of U.S. environmental technology and services. When a significant amount of government funding accompanies this commitment, there is a ready market for U.S. companies to participate in the environmental clean-up opportunities.

I would now like to highlight the key markets in the world where the Department has been focusing its efforts to promote U.S. exports of environmental technologies, equipment, and services.

Asia - Taiwan/Hong Kong/Korea

The Asian environmental market in particular is expanding rapidly. The Department estimates that the market for environmental equipment and services in non-communist Asia is approximately $31 billion. This is based on market surveys conducted by our commercial staffs stationed in the region, and reports from other federal agencies including the Agency for International Development.

Taiwan, Hong Kong and Korea represent the best market opportunities for U.S. environmental companies in Asia. These are what we would call "first-tier" markets. The general climate for trade in the environmental sector in Taiwan and Hong Kong is excellent. Importing pollution control equipment is encouraged, and is not subject to tariff and nontariff barriers. In both countries, the government's commitment to environment protection and remediation is strong.

Taiwan's commitment to environmental clean-up is very comprehensive and enforcement extends even to parastatal enterprises. Taiwan has established an Environmental Protection Agency modeled after the U.S. EPA. It has enacted a very strict regulatory framework, also patterned after the EPA. The country is very serious about enforcement of these regulations. In fact, the government of Taiwan plans to spend about $12 billion on environmental improvement through 1998, an impressive investment by any standards, and one which creates a major opportunity for U.S. exporters. Historically, the United States has accounted for approximately 25 percent of imports in this sector. The Department believes that market growth will continue in Taiwan as the government continues to implement measures to bring the country's numerous small enterprises into compliance with strict regulations. Further cementing Taiwan's commitment to the environment, the Taiwanese Environmental Protection Administration recently established the Environmental Technology Promotion Foundation which will serve as a clearinghouse of information that will assist companies to comply with environmental standards and regulations.

Hong Kong's open market and procurement policies are very favorable for U.S. representing the environmental sector. U.S. suppliers have already found many opportunities to participate in the $20 billion worth of environment-related projects which will be funded during the next decade. Hong Kong also offers excellent opportunities for U.S. suppliers of solid waste handling and disposal services. In addition, there are major projects directed at cleaning up the polluted harbor and waters of Hong Kong's scenic beaches.

The other Asian tiger which we include in the category of first-tier markets is Korea. This country also has established a strong regulatory structure, with stringent enforcement measures and a significant public investment in environmental clean-up. However, American companies often find themselves up against stiff competition from Japanese environmental companies which provide attractive finance packages.

In an early response to these ready market opportunities in Asia, the International Trade Administration organized a very successful trade and investment mission to Taiwan, Hong Kong,and Korea in January of 1991. The mission consisted of about 9 environmental companies representing a broad spectrum of expertise and technology, as well as size. All of the companies which participated were overwhelmed by the market possibilities. The companies had jam-packed schedules, and the only complaint was that they were too busy; but this meant U.S. technology was very much in demand. In fact, Hong Kong had been added as a stop at the last minute, and the mission spent only one business day there. The potential opportunities there are definitely worth revisiting, and companies could have used more time to explore that market.

ASEAN Region

Another region in Asia that shows tremendous potential is the Association of Southeast Asian Nations (ASEAN) region. According to the market studies prepared by the U.S. & Foreign Commercial Service (USFCS), the total market for environmental equipment and services in this region is expected to exceed $1.8 billion in 1993. Sales of filtration and purification equipment for water and wastewater treatment alone will grow extremely rapidly - at a rate of 30-40% - over the next three years. The market for environmental instrumentation and monitoring equipment is expected to expand at an annual rate of 20% over the next several years, in part as a response to development bank demands for stronger environmental controls on the projects they finance. The World Bank, The International Finance Corporation, and the Asian Development Bank have all made environmental controls a priority in projects subject to funding. World Bank appraisal reports for each new project to be considered for financing now include an "Environmental Aspects Section." Projects are being routinely reviewed to ensure that the technologies installed are in accordance with the latest industry environmental standards. An increasing number of projects financed also included an environmental component and require an environmental impact assessment. Of the 222 World Bank projects receiving loans in Fiscal 1990, 107 (or 48% included environmental components). The key countries in the region we have focused on include: Thailand, Indonesia, Malaysia, and the Philippines. The International Trade Administration has organized two success trade missions to this region in the last two years.

Eastern Europe

Perhaps the most dramatic change in demand for environmental accountability is found in the emerging democracies of Eastern Europe. The Department believes the U.S. government has a special role to play in helping the U.S. environmental industry take advantage of the commercial opportunities stemming from the enormous environmental challenges these countries face as part of the Communist legacy. The Consortium for American Business in Eastern Europe (CABEE) funded by the U.S. Agency for International Development and administered by the International Trade Administration seeks to capitalize on this new-found environmental awareness and to mitigate the devastation amassed by 45 years of neglect. Although there are limited near-term market opportunities for environmental technologies, equipment, and services, because of budget constraints, the prospects for long-term market growth are strong. The governments in these countries realize that, despite the pressures to build and expand their economies, they cannot afford to postpone action on serious environmental issues which impede economic growth by their cost in critical health care, declining worker productivity due to environmentally-related diseases, and inadequate water supplies and sanitation.

We estimate the U.S. will continue to get approximately a 10-15 percent share of all environmental technology imports in the region. Currently, however, it is a very small dollar value. We are optimistic that future growth and bilateral and multilateral development assistance will raise the absolute size of the market.

The World Bank recently financed a $200 million flue gas desulfurization project in Poland which is just one illustration of the investment required and the funding being channeled into Eastern Europe. In the last two years, the International Trade Administration organized and led three highly successful environmental trade and investment missions to the region. Government officials and private enterprises participating in the region demonstrated tremendous interest in U.S. technology and expertise. However, competition from Western European countries presents a strong challenge here.

We were greatly impressed by the commitment of the governments of Poland, Hungary, and Czechoslovakia (Czech and Slovak Republics as of January 1, 1993) to clean up problems that had been ignored and allowed to grow out of control for so many years when the region's increasing industrialization was taking place in the former Soviet-Bloc countries. International lending institutions and the U.S. government are placing a high priority on environmental projects in the region. We have seen a substantial opening up of these economies to U.S. imports in general. If we double the percentage of U.S. imports to these countries (a scenario not altogether unreasonable), Poland, the Czech Republic, Hungary, and Bulgaria will move into the top thirty markets for environmental technologies, equipment, and services.

Western Europe

According to the OECD report, Western Europe represents the single largest environmental market at $68 billion. However, because these countries are heavily industrialized and have developed domestic environmental industries to satisfy demand, American companies face stiff competition. U.S. firms that provide niche technologies will have good results in Western Europe and firms with licensing, manufacturing, or joint ventures will prosper from a market that cannot be totally satisfied by European companies. Market growth through the year 2000 will average 5.2 percent according to the OECD.

According to the OECD study, the chief consumers of environmental equipment and services are power and water utilities, municipalities, the mining industry, the chemicals and textiles industries and several other traditional sectors. Environmental investment expenditures as a share of total manufacturing investments range from 2 to 4 percent and have decreased as a share of total investment.

Again, according to the OECD study, and the reports from the USFCS and other federal agencies, the environmental market is driven by enactment of laws related to pollution discharges into the air, water, and soil. Although there are geographic variations in many of the provisions found in the regulations, there has been a consistent trend toward more stringent standards. This phenomenon may be attributed to a heightened awareness among the public in Western Europe translated into a small but vocal "Greens" political movement which spans national boundaries.

The European Community Commission has identified the environmental sector as one on which it will focus policy attention. U.S. exporters must enter this market early to avoid being excluded from the market by standards which favor and regulations which favor European technologies. This is particularly important in light of the increasing number of countries joining or who wishing to join the European Community (EFTA countries and Eastern European nations). European Free Trade Association and Eastern European countries have or plan to adopt EC laws, regulations and standards applicable to environment protection. With these rules in place, the market driving forces will be virtually identical to those of the EC, which may result in trade barriers to entry for American firms.

Of special concern to the Department is the European Community's plans to introduce uniform environmental standards which establish minimum norms that each EC member state must . Standards in and of themselves are no cause for alarm. However, The Federal Republic of Germany which possesses the strictest environmental standards in the Community is working to have its national norms adopted as the EC standard. What is particularly disturbing is that the German norms have embodied in them specifications for the kind of technology/equipment which is permissible to meet the standards--of course, German equipment. This process, if carried out, would establish a market access barrier to U.S. technology and potentially exclude American firms from a lucrative market. ITA is working with the United States Trade Representative and other federal agencies to learn more about the German government's effort and will work with the U.S. private sector and the EC Commission to ensure that any adopted standard is impartial, fair and allows U.S. environmental firms to compete.

Mexico & Latin America

We think Mexico represents the largest market for environmental technologies, equipment, and services in Latin America. The government has focused on the two principal environmental problems-air and water pollution-as the primary priorities for action. The chief institution responsible for implementing and enforcing regulations is the Ministry of Social Development (SEDESOL), the successor to SEDUE (Secretaria de Desarollo Urbano y Ecologia).The Mexican market for environmental technologies, equipment, and services is estimated at $1.1 billion for 1992. The United States accounts for 45 percent of the import market for this sector; growth rates are estimated at 15-20 percent per year in 1993 & 1994.

Mexico faces serious air pollution emissions from fixed and mobile emission sources. In Mexico City, vehicular emissions pose the most serious health threat; pollutants from automobile exhausts include sulfur dioxide, nitrous oxide, ozone, carbon monoxide, and particulates. The Mexican Government is committed to a multi-billion dollar air pollution control program that emphasizes the production of clean fuels, installation of catalytic converters, and improved automobile efficiencies. Pollution from industrial facilities stems from combustion of high-sulfur content fossil fuels. As an immediate step, the Mexican Government's priority is to substitute low-sulfur fuel oil and coal to reduce sulfur dioxide and nitrous oxide emissions.

The immediate need for new pollution control technologies unavailable in Mexico represents an important opportunity for U.S. companies. New business opportunities will be in the sale of air pollution control monitoring equipment, technologies for converting fuels, and air pollution control and abatement systems for stationary pollution sources (scrubbers, bag filtering systems and nitrous oxide control systems).

Water pollution also threatens municipalities' ability to meet stricter water quality standards and stretches the limits of out-of-date water treatment plants which must serve populations far larger than their original design specifications. Water conservation and plant modernization elements critical to the government's plans to improve overall water usage and quality throughout the country.

A strong and growing market exists for aeration systems, chlorinating equipment, pumps, clarifiers, cooling towers, sludge filtering equipment, water quality monitoring systems, and water treatment chemicals. In addition, environmental consulting and engineering services covering environmental impact assessments, feasibility studies, and systems' redesign will figure prominently in the country's efforts to stem the tide of water-borne disease afflicting many communities. Build, operate, and transfer options will also be available to American companies that work with municipalities and industry associations in the construction of wastewater treatment facilities. This will require long-term commitments on the part of American firms interested in this work and possibly creative financing packages to take advantage of the opportunities in the water sector.

Competition from Japan, Germany, France, and Switzerland is strong, with the Japanese Government leading the way in offering financial assistance; nearly $4.6 billion in loans and credits have been extended to the Mexican Government by Japan's Export-Import Bank to address the air pollution problems in Mexico City. According to a recent market analysis by the USFCS in Mexico City, the United States holds a 26 percent share of the import market for environmental technologies and services in Mexico followed closely by Germany with a percent share. In the last two years, the International Trade Administration has organized U.S. company participation in two very successful trade missions (about 20 companies in each) and two major trade shows (35 & 85 companies).

The key Latin American markets outside of Mexico are Brazil, Venezuela, Chile, Argentina, and Colombia. These countries represent a $2 billion market in air and water pollution control and abatement systems, technologies, and services. The majority of this market (70 percent) focuses on municipal and industrial water pollution control, and about 40 percent of these countries' needs will be met by imports from industrialized nations including the United States. Brazil and Chile have the most developed regulatory programs and are the most markets in the near-term. Argentina, Venezuela, and Colombia are moving ahead with plans to formalize their environmental institutional and regulatory framework and establish enforceable regulations which will generate demand for products and services. As these countries do not possess a domestic environmental industry, technology and systems needs will have to be met from imports. Barriers to entry will be minimal because of the pressing demand for improved air and water quality, and threat environmentally-related disease poses to their economies.

U.S. Competitiveness

The above is an overview of the existing and expanding opportunities for U.S. exports in sector. I would like to now address the second half of this equation, U.S. competitiveness. The United States exports an estimated 10 percent of its output in environmental technologies, equipment, and services. It currently enjoys approximately $4 billion trade surplus in trade in the environmental sector. However, the industry is experiencing import penetration in waste treatment and collection systems sector from European firms and, in the air pollution control sector, competition from Japanese and East Asian companies (Taiwan, Hong Kong). the United States exports about 16 percent of its production of industrial air pollution control equipment, import penetration in this sector has now reached 26 percent of apparent consumption.

In general, Germany and Japan are our two largest competitors. Germany is the world's leading exporter of pollution abatement equipment and is particularly strong in the water treatment sector. Japan is a major exporter of all pollution control products, and presents serious competition in incineration technology. The Japanese have developed incinerators that exceed U.S. technology both in terms of capacity that can be handled and the amount of moisture content that can be processed. Another Japanese strength is the country's ability to commercialize technologies developed outside of Japan, often in the United States.

The Japanese Ministry of International Trade and Industry (MITI) is increasing its support environmental research and development. Its R&D program is driving two separate initiatives: the Research Institute of Innovate Technologies for the Earth (RITE) and the International Center for Environmental Technology Transfer (ICETT). Japan has made it clear through these initiatives that it intends to establish the environmental industry as a leading industrial initiative and its goal is to capture market share in key regions of the world.

These organizations fund research in the academic and private sectors and sponsor joint government-industry research consortia. RITE is reputed to target developing countries that have serious environmental problems but cannot afford the extensive cost outlays for existing technology; RITE is reported to be focusing its research on these developing countries and may work with other MITI organizations to finance environmental technology exports created as a result of its R&D program. another MITI entity, the New Energy and Industrial Technology Development Organization (NEDO) is responsible for integrating all MITI environmental technology research programs, including energy conservation.

At the Rio Summit last year, the Japanese Government pledged $8 billion to developing countries to protect their environments over the next five years. And to help build markets for its pollution control technology, Japan's ICETT will train 10,000 developing country officials over the next ten years in energy issues and pollution control technology.

Germany, too, is increasing its environmental assistance to developing countries. In an effort to boost exports of pollution control technologies and to improve environmental conditions in developing countries. This strategy is being carried out through technical assistance projects including training foreign government officials, performing prefeasibility studies, donating equipment, and offering technical advice.

The German Ministry for Research and Technology (BMFT) is promoting environmental research and increasing funding at the expense of its nuclear R&D program. The BMFT's budget allocates $707.5 million to environmental research--including environmental technology, ecological, climate and atmospheric research, and renewable energy sources--a marginal increase of 2.8 percent from the 1992 budget. In addition, the BMFT has established five new research facilities in eastern Germany. In January, the Research Center at Leipzig-Halle opened with an initial focus on developing strategies for environmentally benign processes. The BMFT is also funding "Biotechnology 2000", a five-year project designed to reduce waste production and develop new processes for cleaning soil and waste water. Funding for this initiative is $31.3 million; it calls for cooperative arrangements between German research facilities and private companies for eastern Germany, and even stresses cooperation with American companies.

Environmental assistance to developing countries will remain a prominent feature of German Japanese marketing strategies. By setting the conditions for LDC demand for environmental technologies, assistance from environmental and technical experts from Bonn and Tokyo will help shape future environmental equipment purchases by developing countries. The "carrot and stick" aspects of foreign aid may also be employed to steer large environmental contracts--such as those to build cleaner power plants, for example--toward domestic suppliers. These trends will translate into increasingly competitive markets for U.S. firms vying with German and Japanese firms for market share in the environmental sector. If German or Japanese technology development plans succeed and are commercialized before those of U.S. competitors, market opportunities for U.S. firms will be lost.

Supporting the Environmental Industry - The Department's Role

The International Trade Administration is responsible for the environmental industry with regard to trade promotion and plays a major role in policy activities. Our promotion activities are spearheaded by the environment division of our Trade Development unit. There are several distinct yet interrelated elements to our trade promotion role. Our trade specialists have and continue to identify opportunities for U.S. environmental technologies in existing and emerging foreign markets. We utilize a number of techniques to help U.S. industry capitalize on these opportunities. We use traditional market promotion techniques -- trade missions, trade exhibitions, seminars/conferences -- and recently have introduced a new initiative to combine technical/educational seminars with a business-to-business forum designed to match U.S. environmental technology suppliers with foreign customers. Since 1989, when the industry's interest in foreign markets accelerated, the ITA has organized more than thirty successful environmental trade events in Eastern Europe, Mexico, Brazil, the ASEAN Region, East Asia, and the former eastern Germany. A list of these events is attached. We plan to expand this effort with an ambitious program covering the NIS countries, including Russia, the People's Republic of China, and Latin America.

Additionally, we provide extensive business counselling assistance by international trade specialists in the environmental sector. These specialists also participate in industry conferences and seminars as part of our industry outreach program, and assist industry educational and technical institutions in their efforts to introduce American environmental technologies in foreign countries.

Often, this is done in conjunction with another federal agency such as the Trade & Development Agency. For example, in March, the Air & Waste Management Association, with the United Nations Industrial Development Organization (UNIDO), and the Trade Development Agency, will host a conference in Budapest, Hungary on "Developing a Pollution Control Industry Serving the Central European Metallurgical Industries." The Department will send a representative to participate in the conference and address American companies on export assistance programs from the International Trade Administration. We are also working with the Air & Waste Management Association along with other industry groups to publicize the opportunities for U.S. environmental technologies around the world and encourage them to participate in our export assistance programs.

In addition to programs designed specifically for the environment sector, the ITA has a range of generic export assistance services which are suited to the environmental sector which are available to U.S. firms through the more than 50 district offices in the U.S., and over 130 offices of the U.S. and Foreign Commercial Service. USFCS international trade specialists and commercial officers are dedicated to providing extensive export counselling, information, and business facilitation support to U.S. companies USFCS posts overseas also provide advocacy support of U.S. environmental firms bidding on major foreign environmental projects. USFCS works in concert with other ITA units - Trade Development and International Economic Policy - to provide a full range of market and industry expertise and support to U.S. environmental firms. Specific services include:

- trade opportunity notices available from our electronic bulletin board
- more than 250 market research reports and commercial intelligence information included in the National Trade Data Bank (NTDB)

- the Agent/Distributor Service for in-country representation
- the Comparison Shoppers' survey for tailored, product-specific market studies
- specialized Matchmaker events designed for new-to-market and new-to-export companies
- technical sales seminars/conferences with specific environmental themes organized by the U.S. & Foreign Commercial Service
- specialized counselling and information assistance from the ITA's Trade Information Center, the East European Business Information Center, and the Business Center for the Newly Independent States (EEBIC & BISNIS)
- industry outreach programs conducted by ITA's 52 field offices throughout the country and by the Foreign Commercial Service's 130 offices throughout the world

These are just a few of the better-known programs that are especially useful to the small to medium-sized exporter and at low cost.

ITA's, International Economic Policy (IEP) unit, also offers U.S. companies business counselling to U.S. environmental companies from a country perspective. The Assistant Secretary for IEP serves as cochair with the Agency for International Development's Assistant Administrator for Asia on the Trade Promotion Coordinating Committee's Working Group for the U.S.-Asia Environmental Partnership (US-AEP). This effort brings together the American business community, government agencies and non-governmental organizations in a partnership with our Asian counterparts. The U.S.-AEP is a comprehensive technology, equipment, and services initiative designed to address the region's serious environmental problems, assist in institution building, and take advantage of promising markets emerging as a result of strict environmental legislation and enforcement. The US-AEP specifically addresses the need to create employment in a technology sector recognized as one in which the United States has a comparative advantage. The US-AEP plans to position USFCS personnel in targeted AEP countries who will be assigned exclusively to assist companies in the environmental sector.

The Agency for International Development and ITA will sign a Memorandum of Understanding for the management of the US-AEP's overseas marketing activities. AID will transfer funds to ITA ($1.5 million) to hire environment marketing personnel in nine Asian countries and the Asian Development Bank. All will be under the direct supervision of the USFCS senior commercial officer. The various US-AEP programs in each country will be coordinated by a steering committee chaired by the senior commercial officer (co-chaired in those countries where AID has a mission).

The National Oceanic and Atmospheric Administration also participates in this activity offering its expertise in monitoring air and water pollution using its facilities and technologies it has developed to carry out its mission. With NOAA, the International Trade Administration is working on a Departmental initiative, the National Environmental Technologies Trade Initiative (NETTI). Deputy Under Secretary Josephson has already discussed this initiative so I won't go into any detail on the NETTI other than to point out this a joint effort to use all of the Department's resources to support the environmental sector.

Another TPCC Working Group - Energy, Environment, and Infrastructure - is chaired by the Deputy Assistant Secretary for Basic Industries and is responsible for coordinating intergovernmental planning and implementation of environmental market development programs in targeted markets.

In May 1990, President Bush created the cabinet-level Trade Promotion Coordinating Committee which is composed of 19 federal agencies. The TPCC is chaired by the Secretary of Commerce in October 1992, President Bush signed into law the Export Enhancement Act of 1992 (Public Law 102-429) which, in effect, requires the President to reconstitute the TPCC. The act designated the Secretary of Commerce as the Chairperson, designated the core member agencies and left, to the discretion of the President, the appointment of other members. The TPCC is charged with unifying and streamlining federal trade promotion resources. Today, 13 TPCC working groups exist, most of which, are chaired by Department of Commerce. The TPCC's strategy is three-fold:

- to increase the coordination and communication between TPCC agency members;
- to educate the U.S. business community on the USG's trade promotion programs; and
- to provide the U.S. business community with easy access to those programs.

On November 12, 1991, the United States and Mexican Governments signed a memorandum of understanding which launched the United States-Mexico Environmental Business Committee (EBC). The EBC was created under the auspices of the Joint Commission on Investment and Trade (JCIT). The committee is composed of an equal number of U.S. environmental companies and Mexican firms and private sector organizations who can benefit from American expertise in the environmental sector. The U.S. side is chaired by the Minister-Counsellor for Commercial Affairs at the U.S. embassy in Mexico City and is supported by the Agency for International Development Environmental Program in Mexico.

The committee's objective is to achieve a multiplier effect in providing access to a broad range of expertise represented by the U.S. member companies. This effort, which began with the first official meeting in January 1992, includes training seminars, exhibitions, technology exchanges and other programs which address environmental issues relevant to the United States and Mexican businesses.

The EBC is a continuing effort to bring together U.S. and Mexican government and private sector representatives in a partnership to provide an active exchange and define the most effective and cost efficient means to solve Mexico's environmental problems.

Environmental Policy

Through its International Trade Administration, Commerce is actively involved in domestic and international environmental issues which affect U.S. industry's competitiveness. ITA is involved in the interagency policy coordinating committee process to develop United States Government (USG) positions for international environmental meetings and treaty negotiations. ITA was involved in preparations for the United Nations Conference on Environment and Development (UNCED) held in Rio last June. The Department is taking an active role in the UNCED follow-up process including the creation of the Commission on Sustainable Development (CSD).

The ITA is an active participant in the Montreal Protocol to the Vienna Convention on Substances that Deplete the Ozone Layer and the Basel Convention on Transborder Movement of Hazardous and Other Wastes and Their Disposal.

ITA also works with various OECD environmental working groups including the OECD Waste Management Policy Group, the OECD Pollution Prevention and Control Group and the Technology and Environment Group, as well as the OECD Trade And Environment Group.

The Department has also been an active participant in the Organization for Economic Cooperation and Development (OECD) and the General Agreement on Tariffs and Trade (GATT) Working Groups on Trade and Environment. International agreements increasingly are recognizing the relationship of trade and environmental compliance issues. Both OECD and the GATT recognize that there are environmental issues that trade negotiators should keep in mind when negotiating international agreements. The Department, with both environmental, as well as trade expertise has played a significant role in molding a coherent USG position on this timely and complex issue.

We are also engaged in the International Negotiating Committee for a Framework Convention on Climate Change (INC) negotiations. Worldwide efforts to address global climate change will present both opportunities and challenges for U.S. business. Efforts to reduce emissions of greenhouse gases should create opportunities for sales of more energy efficient industrial equipment of many types, as well as for renewable energy technologies and equipment. But industries will be challenged to improve their energy efficiency and reduce pollution; those that fail to do so are likely to face growing competition, both domestically and internationally.

ITA has also been involved in the United Nations' Economic Commission for Europe (ECE) Long Range Transboundary Air Pollution Convention. As a leader in controlling air pollution, the United States has considerable expertise in addressing air pollution problems. The U.S. was the first country to introduce economic instruments, such as tradeable permits and air quality bubbles to address air pollution problems. Furthermore, by participating in the ECE the United States can pressure some of our major trading partners to adopt environmental regulations more like ours and preclude the adoption of rigid technical standards that would limit U.S. exports of environmental technology, equipment, and services.

Conclusion

The environmental industry has excellent potential for expanding exports. The Department, working with representative trade and industry groups, educational institutions, nongovernmental groups, and other federal agencies has worked diligently to take advantage of our competitive position in this sector. We believe that by promoting environmental technologies, products, and services we can make a significant contribution to creating jobs in an industry where strong demand overseas will continue into the next century.

Mr. Chairman, Mr. Vice-Chairman, and members of the Committee, thank you for the opportunity to testify today.

STATEMENT OF

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FOR OCEANS AND ATMOSPHERE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

BEFORE THE SUBCOMMITTEE ON
ENVIRONMENT AND NATURAL RESOURCES
OF THE COMMITTEE ON
MERCHANT MARINE AND FISHERIES
U.S. HOUSE OF REPRESENTATIVES

FEBRUARY 25, 1993

Mr. Chairman and Members of the Subcommittee:

I am especially pleased to appear at one of the first hearings of this newly created subcommittee. I can tell you that it is good to be here and I look forward to working with you and my NOAA colleagues.

Today's hearing is important and timely. As President Clinton has repeatedly stressed, jobs and environmental protection are not in competition. Rather, it is widely recognized that environmental protection has numerous economic benefits. This is the premise on which your Committee has organized this hearing.

We believe that NOAA can contribute to the Department's important role in promoting exports of U.S. environmental technologies and would like to assist your deliberations by:

(1) familiarizing you with some of the equipment for oceanic and atmospheric monitoring, prediction and clean-up which is commercially available from U.S. manufacturers; (2) discussing the important role of capacity building, training and the transfer of "know-how" in expanding U.S. markets; (3) identifying a few existing U.S. government programs which provide environmental technologies to foreign markets; and (4) offering a few suggestions regarding the possible proposal to promote exports of environmental technology, as mentioned in the letter of invitation.

Before addressing these areas, Mr. Chairman, allow me to make three points about NOAA's role in creating demand in foreign markets through its research and monitoring programs. First, our scientific research demonstrates to foreign nations and corporations the existence of environmental problems by identifying the effects of their actions on Earth systems. Second, NOAA's scientific programs demonstrate that these problems can be rationally addressed, thereby giving the confidence to proceed with sensible remedial or preventative steps. Finally, NOAA's science provides the world with sophisticated tools for use in attaining sustainable development. As a result, NOAA helps generate a demand in foreign markets for U.S. environmental technology. This reflects an important NOAA contribution to the vigor of the U.S. economy.

Available Technologies

Foreign markets already exist but can be expanded for several weather detection and observing technologies developed in the United States. Foremost among these technologies are the following:

- Next Generation Weather Radar (NEXRAD), which is the world's most advanced Doppler weather radar system. Privately produced commercial weather products which are available for sale both internationally and domestically utilize significantly improved meteorological data provided by NEXRAD. The NEXRAD technology itself can be sold to other countries with a sizeable economic gain for U.S. firms.

- Automated Surface Observing Systems (ASOS) which reduce time-consuming manual weather observations and increase staff productivity. Private firms have used ASOS for site environmental monitoring. ASOS is a leading technology suitable for marketing to foreign countries and firms.

- Advanced Weather Interactive Processing System (AWIPS), which enables local forecasters to integrate and process GOES satellite, radar, upper air and surface observation data and guidance information. It will provide a communications capability to collect, integrate, and distribute data to the National Weather Service and to other users such as civil defense and companies that redistribute the data to radio, television, etc. Once developed and proven, AWIPS workstations and software could be sold to other countries and produce significant economic benefits for U.S. firms.

- Geostationary Operational Environmental Satellite (GOES) whose successful use by NOAA lead to development of a modified version by a U.S. contractor that was sold to the Japanese. The market for these satellites is limited.

- NOAA's environmental satellites which permit the real-time dissemination of satellite images and other products to the global community. The GOES Weather Facsimile (WEFAX) system broadcasts weather images and forecast charts to the Western Hemisphere and is the only source of satellite weather data for many Central and South American countries. Several thousand direct-readout (receive) stations for these NOAA services have already been built in foreign markets.

NOAA's oceanic and atmospheric research programs have developed several products which have been transferred to the private sector and could be marketed abroad. These include the following:

- Coastal numerical models developed by the Geophysical Fluid Dynamics Laboratory to predict trajectories of spills and contaminants in the ocean.

- Models to minimize environmental damage by guiding placement of waste discharges in the atmosphere and in U.S. coastal waters. The models, developed by NOAA's Air Resources Laboratory, are used by domestic industries and the Environmental Protection Agency. Both the models and the scientific expertise that created them could be marketed globally.

- A low-cost acoustic system for tracking outfall or sewage waste plumes used by municipal governments on issues related to wastewater. The system was developed by NOAA's Atlantic Oceanographic and Meteorological Laboratory.

- Coastal ocean surface radar, developed by NOAA's Wave Propagation Laboratory (WPL), to help maritime commerce and recreational boating determine surface currents.

- The Radio Acoustic Sounding System, also developed by WPL, which senses temperature profiles of the atmosphere based on sound propagation. A private firm is currently producing several systems.

- The Oceanographic Buoy Systems, developed by the Pacific Marine Environmental Laboratory to study ocean circulation. Several U.S. companies now manufacture this system.

Various technologies with export potential have resulted from NOAA' National Sea Grant College Program. These technologies are used to:

- Preserve fish, extend shelf life and increase by-product recovery.

- Evaluate pile shaft behavior of offshore platform pilings at lower cost than other methods.

- Produce industrial polymers, for example carrageenan, for use in food processing and pharmaceuticals.

- Extract high quality chitosan from shellfish. Chitosan can be used in agricultural products, cosmetics, food, beverages and in medical products such as dissolving sutures. Industry analysts predict a $700 million industry by the year 2000.

- Identify ciquatoxin, potentially fatal to humans, in tropical fish through the use of an inexpensive test. A kit is now being produced commercially by a firm in Hawaii.

NOAA's Coastal Ocean Program has supported the development of several environmental prediction tools having the potential for international scientific and resource management application. These technologies include:

- A method which utilizes available satellite and aerial imagery to map coastal habitats and determine changes over time. This technology will facilitate habitat analyses and management.

- NOAA's CoastWatch network which uses remote sensing, communications, and data management technologies for scientific and resource management applications in coastal areas. Scientists from Saudia Arabia, Japan, the Peoples Republic of China, and several European nations have worked with NOAA staff on adapting CoastWatch technologies, acquiring hardware and software, and developing joint environmental research programs.

- An improved coastal water quality model linking point and nonpoint nutrient loads to their impact on coastal algal blooms and oxygen depletion which threaten fisheries. This technology will improve the effectiveness of pollution control measures.

Technologies developed by NOAA's National Marine Fisheries Service that can be marketed abroad include:

- Revolutionary techniques for growing algal culture for use in commercial aquaculture. These techniques are used extensively by the domestic and foreign aquaculture industry.

- Analytical techniques to detect organic contaminants, biotoxins, pathogenic bacteria and viruses.

New technologies resulting from programs administered by NOAA's National Ocean Service include:

- The Computer Aided Management of Emergency Operations (CAMEO), a system developed in conjunction with EPA to assist emergency personnel to plan for and respond to chemical accidents. Two powerful new versions of the NOAA/EPA chemical emergency planning and response software have been released: CAMEO™ 3.0 and the

ALOHA™ 5.0 air dispersion model. These products are used by over 5,000 emergency response and planning organizations in the United States, Canada, Great Britain, France, Sweden, China, and Australia.

- The Next Generation Water Level Measurement Systems which collect, process, analyze and disseminate water level data in real time to improve the safety and efficiency of maritime operations. This is now marketed through a Maryland company and has been sold in Australia, China and India.

- The Physical Oceanographic Real-Time System (PORTS), a state-of-the-art digital system for real-time measurement and analysis of current, water level, and meteorological information. PORTS improves marine navigation safety and increases the competitiveness of U.S. commercial shipping interests. The technology has been developed and implemented operationally by NOAA using off-the-shelf commercial equipment. PORTS technology can be exported to improve navigation safety in foreign ports; information on PORTS has already been exchanged with Korea, United Kingdom, and Germany.

- The Automated Nautical Charting System which will help to revolutionize marine transportation through the use of digital nautical charts.

- Several Small Business Innovation and Research (SBIR) projects such as: a portable radiometer for measuring atmospheric water vapor; techniques for precise platform positioning using the Global Positioning System; oceanic fiber optic chemical sensors; lobster holding and culturing techniques; low-cost high resolution picture transmission readout stations for polar orbiting satellite image transmission; and a low-cost airborne phytoplankton sensor.

- NOAA's HAZMAT oil spill trajectory model. Workshops on using the model have been attended by an international audience including participants from Kuwait, Canada, China, and England.

- NOAA's Coastal Ocean Management, Planning, and Assessment System (COMPAS) which brings existing but disparate information into one computer environment and simplifies the transfer of information to resource decision makers, enabling more accurate and consistent decisions.

Satellite and information related technologies that may be offered in foreign markets include:

- Software for producing environmental products from satellite data. The software can be modified by private sector companies to produce new and unique applications or products.

- New advanced technology platforms to improve performance of automated remote data collection systems. NOAA's participation in the coordination of the global remote data collection technology will make this technology, marketed by U.S. companies the newest and the best.

- Information services and support data to improve climate and weather information. These services, available from NOAA, can assist in crop modeling for food production.

As you can see from this lengthy and diverse list, NOAA has developed directly, or in cooperation with the private sector and the academic community, numerous products and technologies which have or could find markets overseas. Not surprisingly, these products are related to NOAA's mission. Most enhance our ability to monitor, understand and predict our environment. Others are related to NOAA's natural resource stewardship role.

Capacity Building

Training is an important but often unrecognized aspect of an effective national technology export policy. Explanations of the use and advantages of sophisticated technologies expands markets for U.S. products.

The recently concluded United Nations Conference on Environment and Development (UNCED) highlighted the global need for technology cooperation on environmentally sound technologies. Some key UNCED objectives, endorsed by the United States, to achieve such global cooperation include:

- Ensuring that developing countries have access to scientific and technological information, including information on state-of-the-art technologies.
- Promoting access to and transfer of environmentally sound technologies and corresponding know-how to developing nations.
- Supporting endogenous capacity building to help developing countries utilize environmentally sound technologies.

- Promoting long-term technological partnerships between manufacturers and potential users of environmentally sound technologies.

NOAA's science, technology and natural resource conservation training and education activities, which are integral to our overall mission, also provide an important contribution to help achieve UNCED's objectives.

I would like to discuss several examples.

- Sea Grant: The National Sea Grant College Program has been particularly successful in transferring U.S. environmental technologies, primarily through cooperative international research and international technical assistance and educational activities. Furthermore, the more than 300 educational institutions participating in the Sea Grant network serve as a resource available to other Federal agencies for international initiatives related to ocean and coastal resource research, education, and technology transfer. Placement of Sea Grant graduates in industry, academia and government is another effective method of technology transfer.

- Joint Institutes: NOAA sponsors Joint Institutes (JIs) with several national universities. These programs conduct research and training for U.S. and foreign nationals covering a wide suite of science and technology issues. Individual JI charters are determined by the expertise of the NOAA facility and the partner university.

- Post-Doctoral Program: Foreign students conduct research and develop technologies with assistance from the National Research Council Post-Doctoral Program which is sponsored by NOAA.

- United Nations Environment Program (UNEP) Coastal Zone Management Training: NOAA is presently collaborating with the Army Corps of Engineers and the University of Rhode Island Coastal Resources Center to develop and provide training in coastal resource management for UNEP in Nairobi.

- World Meteorological Organization (WMO): NOAA/NWS participates in the WMO's Voluntary Cooperation Program which provides basic and advanced training in meteorology and related fields for foreign nationals.

- Satellite Applications: NOAA/NESDIS conducts satellite data interpretation and application training courses for foreign nationals in a wide variety of areas such as hydrology, agrometeorology, and meteorology at its Satellite Applications Laboratory. Workshops have been co-sponsored by the United States Agency for International Development (AID), the United Nations Environment Program, the United Nations Economic and Social Commission for Asia and the Pacific, and various foreign governments.

- Selective fishing gear: NOAA, in cooperation with AID, conducts foreign training programs on the use of fishing technology.

- International Oceanographic Commission/Training, Education, and Mutual Assistance Program IOC/TEMA: NOAA participates in the IOC's Training, Education, and Mutual Assistance Program (TEMA). This program develops marine scientific and technological training worldwide.

- Global Environment Facility (GEF) Projects: NOAA is helping developing countries enhance their marine environmental monitoring capabilities through GEF projects. This is being funded through the World Bank. Plans for GEF marine ecosystem monitoring in Africa and Asia involve many NOAA scientists in consultatory and training roles, and will require the use of U.S. designed and manufactured marine monitoring equipment. In addition, NOAA can train foreign scientists concerning state-of-the-art monitoring techniques. These projects will help set the stage for additional exports of NOAA technical expertise and equipment to other regions of the world.

- Aquaculture: Advanced training in the science and application of aquaculture to commercial endeavors is routinely provided by the National Marine Fisheries Service. Scientists and managers from such countries as China, Portugal and Japan undergo intensive training at NOAA laboratories in the latest technological breakthroughs in commercial aquaculture.

- U.S. Environmental Training Institute (USETI): The USETI promotes the transfer of environmentally sound technology and management principles by providing training courses to qualified public and private sector officials from less developed countries. It reflects a joint effort between the U.S. environmental industry and the Federal government. NOAA has been a focal point for working with USETI and providing third world country environmental researchers, science managers and administrators access to NOAA-sponsored technology courses.

- Capacity 21: NOAA is currently evaluating future involvement in Capacity 21, the United Nations Development Program's post-UNCED initiative to develop skills and expertise needed to manage the environment and natural resources in a sustainable manner.

U.S. Government Programs

NOAA already participates in several Department of Commerce programs and is ready to initiate new undertakings in close cooperation with our fellow Commerce agencies. The Commerce Department leads two initiatives to promote the sharing of U.S. industries' world-class environmental technologies:

- the National Environmental Technologies Trade Initiative (NETTI); and
- the Private Enterprise and Government Interaction Working Group (PEGI).

NOAA also participates in the U.S.-Mexico Environmental Business Committee (EBC) and the U.S.-Asia Environmental Partnership (USAEP). The International Trade Administration (ITA) is the Department's lead agency on export promotion and Acting Assistant Secretary Menes will provide further details on the EBC and the USAEP. I will focus my remarks on NETTI, a NOAA/ITA joint venture and PEGI.

1. NETTI

The new leadership of NOAA strongly believes that the issues of trade and the environment are complementary and should not be viewed as consistently at odds. To this end, in keeping with its responsibility to promote environmental quality, NOAA has already initiated a program to hold a series of Environmental Trade Initiatives in developing regions with emerging economies, particularly in Latin America, Asia, and Eastern Europe. The NETTI is a joint partnership of NOAA with the Department of Commerce's International Trade Administration and the Export Import Bank.

The objectives of the initiatives are twofold: (a) to improve environmental quality by informing and educating developing countries about the need for environmental technologies and services; and (b) to increase U.S. exports of environmental technologies and services, which is currently a $200 billion per year market expected to become over $300 billion per year by the year 2000.

NOAA is assisting in the overall organization of the conferences, researching each country's environmental issues, and providing speakers who will discuss environmental problems and the need for environmental technologies.

The first two Environmental Trade Initiatives are to be held in Chile and Mexico. The Chile conference is tentatively scheduled during Chile's Environment Week on June 7-9, 1993. The Mexico conference is September 21-23, 1993. Subsequent conferences are being considered for Korea, Taiwan, China, Portugal and Germany.

2. PEGI

In May 1990, the Private Enterprise and Government Interaction Working Group (PEGI) was established by the Federal Coordinating Council for Science, Engineering and Technology's Committee on Earth and Environmental Science. Its goal is to foster and facilitate environmental and global change research interactions between the private sector and the Federal government. As part of its scope, PEGI works closely with similar international organizations such as COPERNICUS and EUREKA, two European programs which emphasize government/private sector interaction. For example, access for environmental monitoring by U.S. scientists to offshore oil platforms is being done on a worldwide basis by corporations such as British Petroleum and Norway's Norsk Hydro.

Currently, PEGI is working with the Electric Power Research Institute to identify projects in carbon cycle modelling, land hydrology, and climate modelling that can be initiated with specific Federal agencies. In addition, the Gas Research Institute has indicated an interest in establishing joint projects with Federal researchers in the areas of methane use, transportation and monitoring. Working with the American Petroleum Institute, PEGI is exploring the use of industry owned off-shore oil rigs as platforms from which atmospheric, oceanographic and related biological research can be conducted.

NOAA has taken a leadership role and is the focal point for initiating the efforts with the offshore oil platforms and the use of marine biomass for sustainable development and greenhouse gas mitigation activities.

Alternatives

In closing, Mr. Chairman, I would like to offer some preliminary comments on the outline of elements for legislation that you have prepared and ideas for improving the export of U.S. environmental technologies. The Department intends to offer detailed comments after having an opportunity to review the legislation when drafting is completed.

As you will have noted from the examples of technology export and training described in my statement, NOAA's efforts in this regard are closely tied to its mission. I believe that a new office headed by a new Department Under Secretary, as set forth in the outline you have circulated, is unnecessary. NOAA can best undertake its responsibilities if its authorities are not abridged through reorganization.

We believe that without legislation, Federal agencies can cooperate through interagency coordination to promote exports of U.S. technology. Perhaps, particular attention could be focussed on coordination with bilateral and multilateral assistance programs. There is an interagency group, the Trade Promotion Coordinating Committee, chaired by the Secretary of Commerce which my colleague, Jonathan Menes, will discuss more fully in his testimony.

NOAA can play a strong role by contributing its expertise in identifying the need for and use of environmental technologies as well as in developing new technologies.

I hope these ideas will be of use to the Committee as you further consider this important policy issue. I will be pleased to answer any questions.

THE U.S. ENVIRONMENTAL INDUSTRY AND ITS POTENTIAL TO BE THE LEADER IN THE GLOBAL ENVIRONMENTAL INDUSTRY

Summary and data related to testimony provided by
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on behalf of the
Committee on Merchant Marine and Fisheries
Subcommittee on Environment and Natural Resources
February 25, 1993

THE U.S. ENVIRONMENTAL INDUSTRY AND ITS POTENTIAL TO BE THE LEADER IN THE GLOBAL ENVIRONMENTAL INDUSTRY

Summary and data related to testimony provided by Grant Ferrier, President of Environmental Business International, a research and publishing firm serving the business development nedds of the environmentl industry.

RATIONALE FOR FOR A PROGRAM TO PROMOTE THE U.S. ENVIRONMENTAL INDUSTRY

There are several compelling reasons why the United States government should endeavor to promote the U.S. environmental industry in domestic and world markets.

- The environmental industry in the United States is a **significant contributing factor to the economy** and has strong potential for growth well above that of the entire economy. Revenues in the U.S. environmental industry reached $123 billion in 1992 or almost 3% of the gross national product. Commercial, private sector environmental product and service firms employ 975,000 people in the U.S. or one out of every 119 workers.

- The **global market** for environmental products and services will undergo **tremendous growth** over the next twenty years as the importance of environmental quality issues filter down from the public, to government, to regulators and to industry nation by nation. The global market generated $270 billion in revenues last year, concentrated in North America and Western Europe. In the short term growth will be highest in newly industrialized nations such as Southeast Asia, the southern tier of Europe and economically advantaged portion of eastern Europe. In the long term markets will open up in the former Soviet Union and developing nations with the peak of spending for these areas not expected until well into the 21st century.

- The **domestic environmental industry has slowed** in the past few years from a high of 18% in 1988 (after mostly double digit growth throughout the 80s), to 15% in 1989, to 10% in 1990, to 2% in 1991 and 3% in 1993. Firms have experienced considerable slowdowns due to the recession delaying environmental expenditures and hampering state and federal regulatory and enforcement activities, as well as the implicit message sent by the Bush Administration that environmental compliance was not an important priority as evidenced by the regulatory moratorium and the efforts of the now defunct Competitiveness Council.

- Our **major competitors** in the global environmental industry, Germany and Japan in particular, have an advantage in that their governments have long undertaken proactive export programs which have helped their environmental gain marketshare in the U.S. and other markets. Other nations also have a technological advantage in a number of environmental industry segments due primarily to a more stringent regulatory approach in their nation fostering development and marketing of the technology. The most obvious example of this is in air pollution control equipment where Scandinavians, Germans and Japanese all kept up with advancing regulations in their nations throughout the 70s and 80s while U.S. regulations essentially stood still after the groundbreaking first Clean Air Act. Consequently, our largest companies in APC have been bought by foreign concerns (ABB acquired Combustion Engineering for example) and new APC installations in the U.S. now routinely use foreign technology (the Gary, Indiana power plant met new CAA standards with Mitsubishi technology for example).

- **International Relations** is a key benefit of a U.S. environmental export promotion program. The environment is perhaps the area of greatest potential for international cooperation in the 1990s and it is vital for the United States to play an important role in the transition to a sustainable economy. Being the world's leader in providing environmental products and services is the obvious first step.

KEY CONSIDERATIONS ABOUT THE ENVIRONMENTAL INDUSTRY

- **Segmentation** is a key factor when analyzing the environmental industry. The attached segment definitions have become standard in the industry and have been adopted by the Dept. of Commerce for their annual statistical abstract and other uses. It is important to assess markets and competition based on segments as nations typically go through environmental quality eras: addressing problems such as air pollution, solid waste, water pollution, hazardous waste, remediation and recycling in stages.

- **U.S. environmental firms tend to small** to medium-sized firms and not typical exporters. The environmental industry grew up quickly, it remains relatively fragmented and firms tend to be run from a technical rather than a business standpoint. Ironically German and Japanese environmental companies are typically divisions of well-capitalized conglomerates, as opposed to the US model of a smaller entrepreneurial firm. Many U.S. firms with very exportable technology and services have not ventured into foreign markets for want of capital, information about markets and potential customers, and adequate support from government trade representatives.

- **Regulations and their enforcement** are undoubtedly the main driver of business in the environmental industry. A strong domestic market is the best training ground for exporters who hone their technologies and services to meet a demanding market. Environmental regulations and enforcement therefore must continue to be strengthened on the domestic front to foster competitiveness of the U.S. environmental industry. On the other side of the coin is regulatory reform of the technology permitting process. Command-and-control approaches requiring Best Available Control Technology (BACT) and Best Demonstrated Available Technology (BDAT) seem to be on their way out, but EPA has not established a protocol for technology acceptance in many media. As an example, many very promising remediation technologies have been held up for approval because of the long timeframe for acceptance for testing, demonstration and public comment. A recent disturbing example was a radioactive-waste fixation technology developed by Sandia and licensed to a U.S. remediation contractor being shipped over to be tested and matured in Germany (with capital and support from the German government) where testing is accelerated was made readily available. The company plans to then import it back into the United States.

- **Technology** will be a key issue in global markets. Contrary to popular belief, however, the environmental industry is not a "high-tech" industry. The majority of the world's short-term needs are in solid waste management, water treatment and air pollution control. Even some more complicated cleanup solutions do not require new technology but effectively applied existing technology. Expensive technical research efforts, therefore, will be misplaced. The challenge of the global environmental industry will be to engineer solutions that are economically and technically compatible to the objectives of the customer.

- In a similar context, the **majority of environmental revenues are services rather than products** -- although currently the majority of export revenues are in products. Packaging expertise as a service is clearly more difficult than shipping a unit, but this component must be addressed when seeking to support U.S. environmental exports. Selling engineering and consulting services in a foreign country is extremely difficult on one's own, and the success of U.S. firms in this area will depend on its ability to joint venture and team with local talent and labor, as well as demonstrating its own expertise.

- **Financing** will be a vital commodity to offer in the global environmental marketplace. Every nation is aware of their problems but few have effective mechanisms to pay for their solution. Creative municipal project financing, development bank projects, export finance programs, bank loans and venture capital to promising international ventures will all be necessary mechanisms. Domestically this is an issue as well. As regulations move down to smaller and smaller businesses (see CAA Title III), it will be harder and harder for the generator to pay. Hence the importance of driving this engine of the environmental industry by providing attractive loans/credits for pollution control equipment and pollution prevention investments and mechanisms such as government guarantees so these loans can be attractive in secondary markets so the majority of the banking/financial industry can participate.

RECOMMENDED ACTIONS

- **Establishing a national policy** to promote the U.S. environmental industry is of utmost importance. Substantive actions should also include coordinating the efforts on behalf of this issue by various government entities, educational institutions, NGOs, non-profits, trade groups and the private sector in a centralized; highly visible Washington office. Strong leadership is required to represent these diverse groups.

- **Environmental business centers** around the world should be set up to educate people (the ultimate driver of the environmental industry), industry and government on environmental quality issues and to facilitate efforts by U.S. companies to export products and services and connect with partners in the target area.

- **Financial incentives** should be provided to environmental companies and buyer of environmental products and services. Support must also be provided by government for technical and market research.

- The government should actively **promote U.S. environmental companies** in targeted countries and segments of the industry in a comprehensive approach based on accurate market research. The government should also support efforts to collectively represent environmental companies through the private sector in the form support for environmental industry trade associations and public-private partnerships.

I believe by far the greatest opportunity for US environmental firms in this decade will be in developed or newly industrialized nations. No doubt the gravity of the problems is greater in developing countries, but the stage of their evolution in environmental awareness, the current priorities ahead of environmental quality and basic financial limitations clearly also make the developing countries a much less attractive and far more risky market in the short term. We've got to go where the money is and approach international environmental problems on a carefully prioritized basis. There is a predictable development cycle of the environmental movement and corresponding government action/spending in each area. We've just have to target our efforts at the right place at the right time to get the most bang for the buck.

Experiences of strong growth in environmental markets in Mexico, the current spending in Taiwan and Korea, the push for environmental catch-up in lower tier EC countries like Italy and Spain, environmental wannabes like Brazil etc. bear this out. The world needs and wants our environmental technology but timing and staging our efforts will be vital to their effectiveness.

The most exportable environmental products and services are through our existing domestic environmental industry, particularly those related to hazardous waste (cleanup, management, recycling), analytical instruments, solid waste management and our environmental engineering expertise. I believe it is key to focus on these segments where we have a demonstrable technological and experience advantage and to focus these on markets that are reaching the appropriate stage of development.

As an example, in the US more than 50% of revenues of environmental engineering/consulting firms are related to hazardous waste. In western Europe the figure is less than to 20% and in Canada it is less than 10%. These areas are still more in their air and water quality stages and are moving towards their "toxic" stage that we are well along with. In other words, focusing on supporting remedial and hazardous waste management technology exports is very timely. Conversely, attempts to support air pollution control to western Europe would generally be a waste of time as they have finished most of these expenditures and they have a technological advantage anyway.

The window to be the leading nation in exporting environmental products and services is wide open and huge but closing rapidly. We must focus as much of our first-stage efforts as possible on the window in front of us, not yet on those windows on the distant horizon.

ATTACHMENTS

Environmental Industry Segments
The U.S. Environmental Industry
The Global Environmental Industry
The European Environmental Industry
Employment in the U.S. Environmental Industry
Technology Trends in the Environmental Industry
Excerpt from April 1992 EBJ providing an overview of the U.S. Environmental Industry

Environmental Industry Segments

1. Analytical Services
    - a. Environmental Analytical Laboratory Testing
    - b. Lab Services (sampling, lab pack, etc.)

2. Solid Waste Management
    - a. Transportation/Transfer Stations
    - b. Disposal, Landfill Ownership/Management

3. Hazardous Waste Management
    - a. Remediation Construction/Cleanup
    - b. On-site Management/Construction (TSDR-transport, storage, disposal and recycling facilities)
    - c. Off-site TSDR Ownership/Management
    - d. Transportation
    - e. Haz Waste Services (sampling, packaging, labeling, tracking)
    - *includes the above for medical, nuclear and SQG waste
    - f. Industrial services/cleaning: tanks & facilities

4. Asbestos Abatement

5. Water Infrastructure/Treatment
    - a. Water Delivery Infrastructure
    - b. Wastewater Treatment, Delivery and Discharge Equipment
    - pumps, pipes, chemicals, repairs, packaged treatment equipmnt etc.

6. Water Utilities
    - Private sector water delivery

7. Environmental Engineering/Consulting
    - Permitting, compliance, design, project management, O&M, audits, risk analysis, site assessment, impact statements, industrial hygiene, litigation support, pollution prevention etc.

8. Resource Recovery
    - a. Post-Industrial Recovery/Recycling/Scrap
    - b. Post-Consumer Recycling
    - c. Waste-to-Energy
    - d. Non-hazardous chemical/materials recovery/recycling

9. Instrument Manufacturing
    - a. Analytical Testing/Lab instruments
    - b. In-situ/continuous monitoring instruments (non-lab)
    - c. Portable (test kits, hand-held or field instruments)

10. Air Pollution Control Equipment
    - a. Stationary Source Emission Control

11. Waste Management Equipment
    - Equipment for handling, storing or transporting solid, liquid or hazardous waste. Also includes information systems and software

12. Environmental Energy Sources
    - Solar, wind, geothermal, small scale hydro, efficiency

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ENVIRONMENTAL INDUSTRY 1989-1991

INDUSTRY SEGMENT	Revenue & Growth ($ Billions)					
	1989	'88-'89 Growth	1990	'89-'90 Growth	1991	'90-'91 Growth
1. Analytical Services	1.6	23%	1.7	6%	1.7	1%
2. Solid Waste Mgmt	23.5	14%	26.1	11%	27.4	5%
3. Haz Waste Mgmt	12.1	22%	13.3	10%	13.7	3%
4. Asbestos Abatement	3.8	27%	4.0	5%	3.0	-24%
5. Water Infrastructure	11.7	7%	12.1	3%	12.5	3%
6. Water Utilities	11.1	6%	11.5	4%	11.8	2%
7. Engineering/Cons	10.2	26%	12.2	20%	13.4	10%
8. Resource Recovery	14.8	23%	17.2	16%	15.8	-8%
9. Instrument Mfg	1.5	25%	1.7	14%	1.8	4%
10. Air Pollution Control	5.3	-4%	5.4	2%	5.3	-1%
11. Waste Mgmt Equip	9.8	9%	10.4	6%	11.0	6%
12. Envmtl Energy	1.5	25%	1.8	20%	2.0	9%
TOTALS:	106.9	15%	117.5	10%	119.4	2%

FIVE YEAR INDUSTRY GROWTH

Industry Segment	Avg Ann Growth	Projected Revenue ($ Billions)					
		1991	1992	1993	1994	1995	1996
1. Analytical Services	6%	1.7	1.8	2.0	2.1	2.2	2.3
2. Solid Waste Mgmt	5%	27.4	28.5	30.8	32.6	33.9	35.3
3. Haz Waste Mgmt	6%	13.7	14.3	15.6	16.7	17.5	18.4
4. Asbestos Abatement	1%	3.0	3.1	3.2	3.2	3.2	3.1
5. Water Infrastructure	4%	12.5	13.1	13.8	14.5	15.0	15.5
6. Water Utilities	2%	11.8	12.0	12.3	12.5	12.7	13.0
7. Engineering/Cons	9%	13.4	14.3	16.4	18.0	19.4	20.6
8. Resource Recovery	10%	15.8	16.7	18.7	20.8	23.0	25.3
9. Instrument Mfg	6%	1.8	1.9	2.1	2.3	2.4	2.5
10. Air Pollution Control	13%	5.3	5.8	6.7	7.7	8.8	9.9
11. Waste Mgmt Equip	7%	11.0	11.6	12.7	13.7	14.6	15.1
12. Envmtl Energy	7%	2.0	2.1	2.2	2.4	2.6	2.8
Total:	7%	119	125	136	147	156	164
(Composite Annual Growth Rate)			4.8%	8.9%	7.4%	6.2%	5.4%

ENVIRONMENTAL INDUSTRY SEGMENTS 1991

INDUSTRY SEGMENT	PUBLIC COMPANIES			PRIVATE COMPANIES			Estimated Total Revenue ($Bil)
	# Co's	Total Ann.Rev. ($Mil)	Average Rev/Co. ($Mil)	Approx. # Co's	Total Ann. Rev. ($Mil)	Average Rev/Co. ($Mil)	
1. Analytical Services	5	46.8	9.4	1500	1700	1.1	1.7
2. Solid Waste Management	16	14409.2	900.6	5200	13000	2.5	27.4
3. Haz Waste Management	35	4172.1	119.2	2800	9500	3.4	13.7
4. Asbestos Abatement	12	966.2	80.5	2500	2000	0.8	3.0
5. Water Infrastructure	25	6487.8	259.5	2500	6000	2.4	12.5
6. Water Utilities	13	1695.2	130.4	24000	10100	0.4	11.8
7. Engineering/Consulting	24	4317.7	179.9	6800	9100	1.3	13.4
8. Resource Recovery	23	4534.1	197.1	5100	11200	2.2	15.8
9. Instrument Manufacturing	13	776.6	59.7	300	1100	3.5	1.8
10. Air Pollution Control	16	1245.9	77.9	1200	4100	3.4	5.3
11. Waste Mgmt Equipment	16	2014.5	125.9	6000	9000	1.5	11.0
12. Envmntl Energy Sources	9	373.4	41.5	800	1600	2.0	2.0
TOTALS:	207	41,040	198.3	58,700	78,400	1.3	119.4

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THE GLOBAL ENVIRONMENTAL INDUSTRY

	1991	growth	1996
United States	$120	7%	$164
Canada	$10	11%	$17
Mexico	$2	14%	$4
Latin America	$6	12%	$10
Western Europe	$82	9%	$130
East Europe/exUSSR	$14	14%	$27
Japan	$21	8%	$31
Australia/New Zealand	$3	9%	$5
Southeast Asia	$6	14%	$11
Rest of the World	$6	8%	$9
Total	$270	9%	$408

revenues in billions of US dollars, average annual growth over five years

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In simplest terms the evolution of a nation's environmental industry proceeds as follows:

- 1. **Public Pressure** mounts to address environmental problems
- 2. **Government Policy** is declared to stop environmental problems
- 3. **Legislation** is passed to address environmental problems
- 4. **Regulatory agencies** are formed and regulations are promulgated
- 5. **Enforcement** of regulations and is emphasized and generators take compliance seriously, driving considerable business for environmental product and service companies
- 6. **Generators** of pollution and waste take it upon themselves to **proactively manage** and reduce their own environmental problems ahead of government regulations.
- 7. Environmental and waste concerns are **increasingly minimized and internalized** into methods that replace conventional processes that generated waste and pollution, leading to a **decreasing demand for environmental products and services.**

EUROPEAN ENVIRONMENTAL INDUSTRY: BY SEGMENT

	Market Value ($bil)		Growth
Market Segment	1991	1996	% p.a.
Solid/Haz Waste Management	27.1	39.7	8%
Water/Wastewater Treatment	18.6	35.4	13%
Air Pollution Control	12.5	17.5	7%
Contaminated Land Remediation	1.3	3.0	25%
Laboratory Testing	0.9	1.6	12%
Recycling–Post-Ind. & Consumer	8.8	12.3	10%
Engineering/Consulting	7.0	14.1	15%
Waste Mgmt Equip/Instruments	5.6	9.0	10%
Alternative Energy	0.8	1.7	16%
Total	81.6	133.5	10%

EUROPEAN ENVIRONMENTAL INDUSTRY: BY COUNTRY

		Market Value ($bil)		Growth
Country		1991	1996	% p.a.
Division 1:	Denmark	1.4	2.2	9%
	Germany	31.0	45.5	8%
	The Netherlands	4.7	6.9	8%
Division 2:	Belgium/Luxembourg	1.7	2.9	11%
	France	13.9	22.4	10%
	Ireland	0.6	1.0	11%
	Italy	9.1	16.0	12%
	United Kingdom	14.9	27.4	13%
Division 3:	Greece	0.6	1.4	18%
	Portugal	0.7	1.5	17%
	Spain	3.0	6.3	16%
	Total	81.6	133.5	10%

Environmental Business Journal, San Diego, Calif.

THE ENVIRONMENTAL INDUSTRY IN CALIFORNIA

	91 U.S. revs	CA revs	avg ann rev growth 92-96	jobs in CA in 1991
Analytical Services	1.7	0.26	6%	2,600
Solid Waste	27.4	3.10	5%	27,500
Hazardous Waste Mgmt/Remed.	13.7	2.10	6%	19,100
Asbestos Abatement	3.0	0.45	1%	4,500
Water Ttrmnt/Equip/infrastructure	12.5	2.15	4%	16,100
Private Water Utilities	11.8	2.26	2%	15,700
Engin/Consulting	13.4	2.58	9%	26,800
Resource Recovery/Recycling	15.8	2.80	10%	40,000
Instruments	1.8	0.29	6%	2,200
Air Pollution Control	5.3	0.64	13%	5,300
Waste Mgmt Equip	11.0	1.70	7%	12,100
Alternative Energy	1.8	0.80	7%	7,300
Total	$120	$19.3	7%	179,200

revenues in billions, $120 billion represents 2.9% of the GNP, $19.3 represents 16% of $120 billion

971,000 total U.S. jobs represents 0.84% of the US workforce of 116 million or 1 out of 119 workers

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EMPLOYMENT IN THE ENVIRONMENTAL INDUSTRY

	91 revs	Employees	rev growth 91-96	new jobs by 96	new jobs by 96 in CA
Solid Waste	27.4	228,000	7.9	67,000	7,800
Resource Recovery/Recycling	15.8	144,000	9.5	82,000	16,400
Water Treatment/Equip	12.5	89,000	3.0	22,000	3,900
Hazardous Waste	13.7	119,000	4.7	41,000	6,500
Engin/Consulting	13.4	134,000	7.2	72,000	14,400
Private Water Utilities	11.8	65,000	1.2	7,000	1,500
Pollution/Waste Mgmt Equip	11.0	78,000	4.1	29,000	4,800
Air Pollution Control	5.3	38,000	4.6	33,000	4,500
Asbestos Abatement	3.0	27,000	0.1	1,000	180
Analytical Services	1.7	17,000	0.6	6,000	880
Instruments	1.8	14,000	0.7	5,000	750
Alternative Energy	20	18,000	0.8	7,000	2,900
Total	120	971,000		372,000	64,500

revenues in billions, $120 billion represents 2.9% of the GNP

971,000 total U.S. jobs represents 0.84% of the US workforce of 116 million or 1 out of 119 workers

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TECHNOLOGY/TRENDS IN THE ENVIRONMENTAL INDUSTRY

EBJ Segment	Current/Old Technology	Future Technology/Applications
1. Analytical Services	Gas Chromatography, Mass Spectroscopy	GC/MS, FTIR, bioassay, SFE sampling, etc.
	laboratory instruments → → → →	field test kits
	one-time analysis → → → →	continuous monitoring/analysis
2. Solid Waste Mgmt	trucks, holes in the ground → → →	better holes, recovery technologies
International	indiscriminate dumping → → → →	sanitary landfills with engineered design, lining, leachate/wastewater treatment, daily cover, gas recovery
3. Hazardous Waste Management		
Remediation	off-site disposal → → → →	on-site treatment
	dig-and-haul, pump-and-treat → →	bioremediation, soil venting, extraction, fixation, stabilization, etc.
	engineering site assessments → →	sophisticated systems for site characterization and monitoring
	clean it up at all costs → → → →	risk-based decisions
	fences & signs → → → →	fences & signs
Off-site Disposal	landfill, incineration → → → →	minimization, recovery, recycling, separation of wastestream
* *Volumes/market already down due to minimization*		
On-site Tmnt/Disp	containment, storage → → → →	prevention/minimization, separation, recovery
Transportation	trucks/rail → → → →	close loop, less volume, from TSDs to better production/recovery
Nuclear Waste	containment → → → →	better boxes, holes in the ground, Yucca Mtn., treatment?
Medical Waste	incineration → → → →	more incineration, treatment
Small Quant Gens	legal/illegal disposal → → → →	legal disposal, treatment, recycling (used oil, solvents, volatiles)
4. Asbestos Abatement	abatement, caveman scrape it off and haul it away tactics → → → →	containment/fixation, don't make it

ENVIRONMENTAL BUSINESS JOURNAL

EBJ Segment	Current/Old Technology	Future Technology/Applications
5. Water Infrastructure		
Water Purification	chlorine/chemicals, flocculation, activated carbon	ozone, ultraviolet, reverse osmosis, desalinization, distillation
Wastewater Treatment		
primary	filtration, settlement tanks, precipitation	improvements, pre-treatment at source, some recovery
secondary	breakdown organics/reduce BOD with natural/biological processes, aeration, activated sludge	more advanced biotreatments, ion exchange for metals, precipitation
tertiary	activated carbon, chemicals, bio	modular systems of ozone, carbon, reverse osmosis, UV, advanced batch bioreactors, etc.

** All wastewater (sludge, variety of industrial) is different and subject to different standards of discharge (NPDES or POTWs) -- yielding low potential for standardization of equipment*

EBJ Segment	Current/Old Technology	Future Technology/Applications
6. Water Utilities	pipes, pumps etc. → → → →	reclamation systems for drinking or non-potable/irrigation/industrial use, desalinization
International	strong need for basic water infrastructure equipment/design	

7. Engineering/Consulting

** Primarily a service business. The predominant solutions in all media are not an equipment choice but an engineered solution to meet the particular needs of a situation -- again little standardization. In effect environmental e/c firms are often the salesmen of technology.*

EBJ Segment	Current/Old Technology	Future Technology/Applications
	multi-industry, turnkey contractors	technical and/or industrial specialization in increasingly competitive business
Asmnt/permitting regulations/design	pen & pencil	info systems, regs-in-a-box, data, site characterization

EBJ Segment	Current/Old Technology	Future Technology/Applications
8. Resource Recovery/Recycling		
Post-Industrial	mfg site recovery for off-site reprocessing → → → →	mfg infrastructure to reuse
	design for low-cost, disposability →	DFD design for disassembly
Post-Consumer	hand-sorting, source separation →	mechanical sorting, processors of material
Shift from a linear to a circular economy		
	low value of raw material → → → →	highly valued raw materials
	lack of infrastructure to process recyclables → → → →	creation of infrastructure
	raw material prices up and disposal costs up → → → →	recycling economy
	environmental externalities paid for by loss of value of environment and natural resources	externalities paid for by internalizing environmental/social costs in mfg/purchase price of all goods and services
9. Instrumentation	sample and take to lab → → → →	on-site/continuous testing/monitoring
	stack testing for air → → → →	extractive sampling/testing
10. Air Poll Control	end-of-pipe, FGD, ESP, filter → →	advanced techniques, prevention, fuel substitution (clean coal), process change
	catalytic converters → → → →	alternative fuels, zero emission
	air toxics unregulated → → → →	CAA, small emitters process change
	command & control regs → → → →	market-based approach, emissions permit trading
11. Waste Mgmt Equip	trucks, suits, containers	same, waste reduction, change materials
	clipboards → → → →	software, info systems
12. Alternative Energy	fossil fuels → → → →	renewables, solar, wind, geothermal, small hydro, biomass, efficiency
	utilities make more energy → → →	use more efficiently, invest in DSM
	research	fusion, hydrogen, etc.

ENVIRONMENTAL BUSINESS JOURNAL

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REDEFINING THE ENVIRONMENTAL INDUSTRY
Environmental Business Publishing Inc.

EBJ EXECUTIVE SUMMARY

Growth rates in the environmental industry in the late 80's were clearly unsustainable, but even the most conservative projections anticipated more than three times the 2% growth seen in 1991. The recession was no doubt the main reason for such a dismal performance, but increased competition, waste reduction efforts and the inevitable leveling of growth characteristic of a maturing industry also put pressure on environmental firms. These four forces combined to make 1991 a sobering year for environmental companies. Business doesn't look much brighter for 1992, either. Even though the economy is expected to turn around gradually, environmental work will continue to take a back seat while industry gets back on its feet. Governments will continue to struggle to gather the resources necessary to catch up with their regulatory and enforcement agendas, in addition to carrying out their own environmental projects. The environmental industry will trail the recovery, but there is a distinct possibility that certain segments will make up for lost time. Growth will pick up in 1993 and 1994, but inevitable and complex forces already at work will gradually diminish the growth rate. The peak of the environmental industry as we know it today is on the horizon Although it is not destined to go the way of the dinosaur, it will if shows a similar failure to adapt.

1991 WAKE-UP CALL

The recession sent chills through revenue growth and profitability in the environmental industry in 1991. Combined with other factors, it fired a warning shot of continued decelerating growth throughout the 90s. Industry trends point to the sobering truth that the environmental industry cannot sustain itself in its present form.

Redefining the environmental industry for 1991 didn't involve the addition or renaming of segments but it did result in some more accurate accounting. Analysis of past years included the revenues of conglomerates and diversified companies as separate line items in the industry total, but these are now embedded into the private company section on the table on page 7. We acknowledge some double counting in the past, as is often the danger with sell-side analysis, so we have updated our figures published in the last two April issues of EBJ. The table on page 6 shows the adjusted totals, including some minor adjustments in segment revenues.

Annual industry growth has fallen from 15% in 1989 to 10% in 1990 and down to 2% in 1991. However, as the economy rebounds and the quest for environmental quality at a reasonable cost continues, growth is expected to average 7% per year over the next five years.

RECESSION'S EFFECT RUNS DEEP

Two years ago we concluded our annual industry overview report with the prediction that composite annual growth for the entire environmental industry would average 11% for five years, but that growth would be subject to two unknowns: regulations and the economy. Little did we know that the latter would play such a dampening role. Besides postponing environmental work and reducing demand for environmental services, the economy also delayed the evolution of regulation, the primary driver of the environmental industry.

The recession has affected the pace of regulation not only by imposing a thinly veiled "moratorium" on new regulation but more significantly by putting the squeeze on government budgets, particularly at the state level. State departments are often the first line of enforcement, and there is evidence of some relaxation in state activities. In most constituencies, political emphasis has shifted in favor of the economy at the expense of the environment, although no politicians have spoken from platforms that are overtly anti-environmental.

In spite of the recession, most industry analysts believe there is reason for environmental companies to be bullish, at least for the next five years. Like regulation, other industry drivers such as fear of liability and the importance of cultivating a clean corporate image will not disappear. But industry growth is no longer strong enough to carry all environmental companies. In the 80s, companies thrived on the basis of good project management. In the 90s, companies will only survive with the addition of good business management.

Solid waste management continues to be the largest and most mature environmental industry segment, but it can't rely on business as usual. The vast majority of the more than $27 billion in revenues result from collections (about 76%), but the operation of transfer stations and landfills represent growing proportions of revenues.

Declining landfill capacity increases transfer station business, where flatbed trailers are loaded from conventional garbage trucks, enabling large volumes of waste to be hauled over longer distances. Landfill shortages have understandably led to higher tipping fees, up 6% in the Northeast and 32% in the West from 1988 to 1990, according to a recent survey by the **National Solid Wastes Management Assn.** (Washington, D.C.). Landfill costs will continue to increase due to more stringent regulations, namely RCRA Subtitle D, which is expected to result in the closure of half of the country's 6,000 remaining landfills.

The trend towards fewer and larger landfills plays into the hands of the larger competitors, which have historically grown through acquisition. In fact, 80% of environmental industry acquisitions from 1985-1990 were in solid waste, a total of nearly 1,400. And the binge doesn't appear to be over. Joan Berkowitz of **Farkas & Berkowitz Co.** (Washington, D.C.) said that with numerous small private operators still in business, there is "plenty of room for further consolidation." Berkowitz also notes that more companies are showing financial muscle, with 10 firms going public in the past couple of years.

In spite of the advantages enjoyed by larger firms, the recession ensured that 1991 was no banner year in solid waste. Volumes of waste were down, particularly in the commercial/industrial sector, which provides almost 70% of collection revenues. Some companies suffered unexpectedly poor quarters, and overall operating margins of publicly traded companies in 1991 fell to 15% from 20% in 1990. EBJ Index company revenue was up 23% in 1991 (over four

continued on page 6

GREENER PASTURES OVERSEAS

Toward a Global Market for E/C Firms

The recession may have upended U.S. markets, but many engineering/consulting (e/c) firms have refused to allow domestic travails to derail international expansion plans.

Companies continue to win contracts, negotiate joint ventures, open overseas offices and launch international subsidiaries, despite the lingering economic paralysis. While costly in terms of capital now, these companies expect that financial hardships incurred now will reap handsome dividends later, when global presence becomes a necessity, not a nicety.

As Robert Uhler, senior vice president for J.M. **Montgomery Consulting Engineers** (Pasadena, Calif.), noted, "If we were just thinking about short-term earnings, we would never have left the United States."

Montgomery is merging with a U.K. water and wastewater consulting company, **Watson Hawksley Group**, as part of a new international strategy that emphasizes local presence over long-distance pursuit of international lending agency contracts. "Truthfully, I don't think that the recession affected our thinking" about expansion, Uhler said.

But access to a recession-resistant source of capital has been crucial: Some of the smaller companies ($50 million or less in revenues) were forced to shelve plans because of capital constraints, said Hugh Holman, an analyst with **Alex. Brown & Sons** (Baltimore). Jeffrey Berg, of **Raymond James & Associates** (St. Petersburg, Fla.) agreed, noting that "the companies that are not entrenched are pulling back a little," while those that have already made the capital investment are pushing forward with plans.

Not only are consultants pursuing strong, established markets such as the EC and Pacific Rim regions, but they're courting contracts in Eastern Europe, the Commonwealth (former Soviet Union) and Mexico, which presented little or no environmental opportunities until the U.S.-Mexico Free Trade Agreement negotiations.

A couple of years ago, management at engineering/consulting companies claimed that the tremendous problems associated with former Soviet Bloc and Soviet Union countries—unstable economies and worthless currencies—far outweighed the tremendous opportunites. But billions of dollars in cleanup costs apparently proved too attractive to ignore. Since then, several companies have actively pursued contracts in these countries, relying on a variety of strategic approaches.

Halliburton NUS Environmental Corp. formed a joint venture with **MIBRAG**, a German company, which will target cleanup opportunities in Eastern Europe. **Baker Environmental Services** took a similar route, teaming with another German company, **Gehrmann Consult GmbH. Camp Dresser & McKee Inc.** will team with **TUV Bayern Sachsen**, a quality assessment and environmental management company, for remediation and pollution prevention projects within the newly unified Germany.

ICF International Inc. went further east to find its partner: The Moscow-based joint venture, ICF/EKO, includes five Russian organizations involved in environmental protection. The venture is targeting not only Western companies investing or establishing operations within the former Soviet Union, but also Russian or other Commonwealth companies or groups.

ICF's Global Trade and Investment subsidiary has made the company competitive in these countries, because it can arrange payment on either a ruble or countertrade arrangement, said Nicholas Burakow, senior VP for international at ICF. But subsidies from the German and Italian governments have given some of these countries' more aggressive players a definite edge in contract negotiations, he said.

Still, these countries are "easier to break into" than Western European nations, because American companies don't have to go head-to-head with firmly entrenched "national champions," Burakow said.

In the meantime, American companies gain valuable international expertise, which could eventually open doors in Western Europe, he noted.

SOUTH OF THE BORDER

Warming of trade relations between the United States and Mexico, together with heightened enforcement efforts by the Mexican environmental agency, SEDUE, has prompted many U.S. environmental companies to expand southwards.

In late February, President Bush presented a plan that calls for the two countries to spend $850 million over the next three years to clean up environmental catastrophies created by rapid industrialization along the border. Environmentalists have lamented for years about flagrant dumpings of hazardous and other types of waste by American companies and others.

Many of the environmental entrants come from the hazardous waste industry, where executives perceive that heightened enforcement of maquiladora industries will generate more demand for treatment and disposal services, said Raymond James' Berg. But **CH_2M Hill Cos. Ltd.** (Denver), **Dames & Moore** (Los Angeles) and others are also eyeing border opportunities, he said. Last summer, **Bechtel Group Inc.** (San Francisco) formed a Mexican joint stock company, Consorcio Internacional de Proyectos Integrales, S.A. de C.V., that planned to initially target, in part, environmentally driven programs for Mexico's petroleum, petrochemical, refining, chemical and industrial industries, the company said. ■

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times our estimated total segment growth), highlighting the advantages of larger players, but acquisitions account for much of that revenue growth.

A key trend facing solid waste companies is what **William T. Lorenz & Co.** calls a "major structural change in the solid waste business." Solid waste's broad-based adoption of "integrated waste management" will divert more waste from landfills into recycling and waste-to-energy. Companies not offering alternatives to landfill will find it difficult to renew municipal contracts and compete for privatization contracts from the more than 25% of the business that still remains in the public sector. But integrated services don't come cheap, and the expense of adding recycling programs was a major factor in the erosion of earnings of many solid waste leaders.

Resource recovery includes companies in post-industrial recycling, post-consumer recycling, waste-to-energy and the recovery of chemicals or other materials from industrial wastes. Resource recovery experienced the largest revenue drop of any segment in 1991 as the market value of the materials recycled by the scrap and post-consumer businesses diminished, most by 20-50%. Revenues of EBJ Index companies were down 8% in 1991.

Last year was tough for manufacturing, making it doubly tough for recyclers already struggling with unstable demand for their recovered materials. Prices for virtually all materials plummeted as demand was weak and oversupply was commonplace. Prices paid by end-users, however, remained more than twice as high as prices paid by processors, lending credence to our assertion that processors are in the most stable sector of the recycling business. Niche players like Imco in aluminum cans, Allwaste in glass and a number of firms in the established steel scrap business managed to scrape by.

Besides the creation of a manufacturing infrastructure to use recycled materials at home, a worldwide recovery is needed rebuild demand as much of America's waste products go abroad. More than 6.6 million tons of waste paper was exported last year (20% of that recovered), and it is consistently one of our top exports by volume. Numbers on domestic plastic recycling are elusive, but shipments of plastic waste overseas reached $100 million last year.

The waste-to-energy business has been up and down in the last few years. More than 100 projects have been canceled but new projects under construction and in planning are expected to provide the added capacity to handle nearly 25% of municipal solid waste by 2000. Some projects have been put on hold, however, as municipalities await the results of the favored alternatives of source reduction and recycling. Waste-to- energy was a $2-billion market in 1991, with two firms, Wheelabrator and Ogden Projects, splitting about 40% of the market

Chemical recovery is a blossoming business for a number of companies, and opportunities will continue to emerge. Horsehead Resource Development, a $70-million firm, recovers zinc from furnace dust. Regenex recycles industrial polymer waste and spent antifreeze into ethylene glycol for new antifreeze. Molten Metal Technology uses catalytic extraction to reclaim metals from a variety of wastestreams. These few examples illustrate the growing opportunities for services and technology demanded as regulations require further separation of chemical wastes as a result of land-ban regulations.

ENVIRONMENTAL INDUSTRY 1989-1991

INDUSTRY SEGMENT	Revenue & Growth ($ Billions)					
	1989	'88-'89 Growth	1990	'89-'90 Growth	1991	'90-'91 Growth
1. Analytical Services	1.6	23%	1.7	6%	1.7	1%
2. Solid Waste Mgmt	23.5	14%	26.1	11%	27.4	5%
3. Haz Waste Mgmt	12.1	22%	13.3	10%	13.7	3%
4. Asbestos Abatement	3.8	27%	4.0	5%	3.0	-24%
5. Water Infrastructure	11.7	7%	12.1	3%	12.5	3%
6. Water Utilities	11.1	6%	11.5	4%	11.8	2%
7. Engineering/Cons	10.2	26%	12.2	20%	13.4	10%
8. Resource Recovery	14.8	23%	17.2	16%	15.8	-8%
9. Instrument Mfg	1.5	25%	1.7	14%	1.8	4%
10. Air Pollution Control	5.3	-4%	5.4	2%	5.3	-1%
11. Waste Mgmt Equip	9.8	9%	10.4	6%	11.0	6%
12. Envmtl Energy	1.5	25%	1.8	20%	2.0	9%
TOTALS:	106.9	15%	117.5	10%	119.4	2%

Accelerated recovery of chemicals, more stringent regulations and interstate transfer limitations pose a threat to companies in traditional forms of hazardous waste management, a $13.7-billion business in 1991. Off-site services, construction and disposal associated with remediation and on-site management of ongoing wastestreams make up most of the chemical waste market. Nuclear waste and medical waste each provide markets of over $1 billion.

Business for disposal leaders Chemical Waste Management, Laidlaw, Rollins, USPCI and others was fairly flat in 1991, and with some exceptions, prospects for 1992 are much the same. Growth will return with economic recovery, but forces changing the nature of this segment and ability to diversify will be key to each company's success (see page 10).

Environmental engineering/consulting was the only segment to maintain double-digit growth in 1991. Net revenues of indicator companies in the EBJ Index rose 14%, slightly ahead of our segment estimate of 10% growth. The market reached $13.4 billion in 1991. Gross revenues of the top 30 engineering/consulting (e/c) firms topped $5 billion (see page 3), and the top 10 environmental contracting/construction firms topped $4 billion. However, the latter figure did not contribute entirely to the revenues in this segment (see box on page 8).

The federal market showed the strongest growth, thanks mostly to cleanup agendas at DOD and DOE. These markets are partially responsible for introducing new competition into the e/c segment in the form of construction firms, defense contractors and other diversifying companies. The municipal market was slow in 1991 due to financing problems from the recession. The recession also affected the industrial market, though more selectively and on a regional basis.

Carolina and Illinois. Looking to the future, Handex has increased its R&D budget, partially to move into alternative technologies such as bioremediation and low-profile air strippers.

While business in **Harding Associates'** (Novato, Calif.) back yard suffered as California's property transfers and construction projects ground to a halt, growth outside of California was up 26% for second quarter fiscal 1992. Overall growth for the same period was 12%. Revenues outside of California now account for 51% of Harding's business and are primarily attributable to CERCLA and RCRA-related contaminated site practices in the western, midwestern and north eastern regions.

Harding's business outside California took a jump with the May 1991 acquisition of **Yates & Auberle Ltd.** (Chicago). (About half of Harding's growth outside that state is attributed to the acquisition.) Yates & Auberle, a 40-person environmental engineering firm, does about half of its business in air quality management, a field Harding has pegged as a growth opportunity.

ICF Kaiser Engineers (Oakland, Calif.), a subsidiary of **ICF International Inc.** (Fairfax, Va.), has its eye on the DOE market, like a number of other firms in construction, defense and engineering/consulting. The DOE market is currently increasing at a rate in excess of 35% annually, according to Dr. Marc Tipermas, chairman of ICF Kaiser Engineers' Environment Group.

Already at work at 10 DOE sites, ICF Kaiser announced a five-year, $25-million contract to provide support to DOE's Environmental Restoration Program at the Mound plant site near Dayton, Ohio. Other big DOE awards for last year include a $40-million, five-year engineering project at Los Alamos National Lab (New Mexico) and a $10-million project at Brookhaven National Lab (New York). **Kaiser Engineers Hanford Co.** (a subsidiary of ICF Kaiser Engineers) is completing a five-year, $570-million remediation project at DOE's Hanford Nuclear reservation and is competing for the five-year follow-on contract valued at $500 million.

Roughly 40% of ICF International's gross revenues in 1991 were from contracts with government agencies, with DOE contributing almost half. Diversity is obviously important in customer mix as well as a company's blend of products and services, and ICF also continues another form of diversification by pursuing the global market. ■

CONSTRUCTION FIRM TURNS TO TURNKEY ENVIRONMENTAL SERVICES FOR GROWTH

Sludge may be a dirty job, but **Stone & Webster Environmental Services Inc.** (Boston) is more than happy to do it.

For Stone & Webster, New York City's big problem—a court-ordered mandate to halt ocean dumping of the 330,000 cubic yards of sewage sludge produced daily—meant big bucks. The fast-track project will amount to nearly $2.5 billion once completed, involving everything from hazardous waste investigations to construction of a dewatering facility and requiring management of more than 60 subcontractors.

President James Cleveland believes that Stone & Webster Environmental's strength lies in the engineering/construction company's ability to tackle a project such as the New York City sludge contract from "soup to nuts."

Construction, cost estimating and project management capabilities prove invaluable not only in winning turnkey contracts but in designing better projects, Cleveland said. In addition, full-service capabilities may become essential to securing "partnering" agreements, an interactive relationship between client and contractor that is increasingly favored by large corporations coping with a multitude of environmental issues and regulations.

Stone & Webster has developed "several" partnering arrangements, with organizations such as **Tennesee Valley Authority** and **BP Chemicals**, and other agreements are now under negotiation, he said.

Historically, industries such as power, chemicals and pulp and paper represent the backbone of this 103-year-old company, Cleveland said. Approximately 50% of Stone & Webster Environmental Service's revenues come from private-sector contracts, while public-sector projects such as water and wastewater treatment, hydroelectric and cleanup of DOE and DOD sites, account for the rest.

Management made the "conscious decision" not to pursue Environmental Protection Agency projects, despite the undeniable financial lure associated with ARCS contracts because of conflict of interest concerns, he noted. Helping the EPA to develop regulations that could affect clients not only doesn't engender goodwill: More importantly, it raises "liability as well as indemnification," concerns, he explained.

Environmental projects generate approximately 35% of **Stone & Webster Engineering Corp.**'s revenues, which totaled more than $660 million in fiscal 1991 ended Dec. 31, Cleveland said. The environmental division bids on "environmental only" contracts, but it also collaborates extensively with other divisions on environmental aspects of projects such as Clean Air Act compliance for power plants. Of the $227 million reported in environmental revenues last year, wastewater and water supply accounted for 35%; hazardous waste, 25%; solid waste and residuals management, 20%; and air pollution and decontamination/demolition, the rest.

Revenues for Stone & Webster Environmental Services climbed from 30% of total company revenues in 1990, to 35% in 1991 and will probably increase to more than 40% in 1992, he noted. While revenue growth continued, the recession did affect business, primarily by delaying contracts and cutting demand for industries such as power, he said.

Approximately 20% of Stone & Webster Engineering Corp.'s international projects are environmental, with most of the parent company's revenues coming from process- and energy-related work, he said. Stone & Webster maintains offices in the United Kingdom, Saudi Arabia, Canada, Thailand, Malaysia and South Korea. While Stone & Webster Environmental is "evaluating a number of opportunities" in eastern Europe and the Commonwealth for the long term, these regions don't provide as much short-term interest as Saudi Arabia and the Pacific Rim, he noted. ■

GLOBAL ENVIRONMENTAL BUSINESS JOURNAL

debuts this summer. Global EBJ will focus EBJ's cutting edge qualitative and quantitative analysis on the global environmental industry. It will provide an in-depth look at market opportunities, regulatory climates, technology, finance, competition and buying patterns of generators and government in Europe, the Pacific Rim and the developing world.

Global EBJ will be published 6 times a year for a subscription price of $495.

ENVIRONMENTAL INDUSTRY SEGMENTS 1991

	PUBLIC COMPANIES			PRIVATE COMPANIES			Estimated Total Revenue ($Bil)
INDUSTRY SEGMENT	# Co's	Total Ann.Rev. ($Mil)	Average Rev/Co. ($Mil)	Approx. # Co's	Total Ann. Rev. ($Mil)	Average Rev/Co. ($Mil)	
1. Analytical Services	5	46.8	9.4	1500	1700	1.1	1.7
2. Solid Waste Management	16	14409.2	900.6	5200	13000	2.5	27.4
3. Haz Waste Management	35	4172.1	119.2	2800	9500	3.4	13.7
4. Asbestos Abatement	12	966.2	80.5	2500	2000	0.8	3.0
5. Water Infrastructure	25	6487.8	259.5	2500	6000	2.4	12.5
6. Water Utilities	13	1695.2	130.4	24000	10100	0.4	11.8
7. Engineering/Consulting	24	4317.7	179.9	6800	9100	1.3	13.4
8. Resource Recovery	23	4534.1	197.1	5100	11200	2.2	15.8
9. Instrument Manufacturing	13	776.6	59.7	300	1100	3.5	1.8
10. Air Pollution Control	16	1245.9	77.9	1200	4100	3.4	5.3
11. Waste Mgmt Equipment	16	2014.5	125.9	6000	9000	1.5	11.0
12. Envmntl Energy Sources	9	373.4	41.5	800	1600	2.0	2.0
TOTALS:	207	41,040	198.3	58,700	78,400	1.3	119.4

Industrial customers represent almost 60% of the e/c market, and some notable business trends are occurring in this sector. Major corporations are increasingly seeking national agreements with e/c firms. Examples of *Fortune* 100 companies cutting their environmental consultants from more than 50 down to less than 20 are not exceptional. Like other segments, the advantage is tilting in favor of larger national firms, but even tiny e/c companies can thrive in focused niches.

Competition for business will be the focus of the 90s. Alan Farkas of Farkas Berkowitz & Co. comments that competition has gotten more "heterogeneous" in the 90s. Distinct types of engineers and firms and their respective markets are blending together and are also having to take on new entrants from other industries "With increased heterogeneity, comes the basis for stronger competitive intensity," said Farkas. Although it is not yet prevalent, "we will see stronger competition in the years ahead."

A segment that has experienced intense competition is analytical services. An overcapacity of labs has made pricing pressure the main challenge for managers. The recession has also slowed demand, yielding a flat 1991 with revenues of $1.7 billion. Growth should return following some consolidation but won't near the rates of the mid-80s.

We have traditionally viewed analytical services as a forerunner for the entire environmental industry. Most work in projects and services, as well as equipment purchases, follows some form of environmental testing. Rapid growth in the 80s came ahead of other segments, and it stands to reason that other environmental services will follow a similar course. Overcapacity in the testing business could foreshadow oversupply in other services, leading to price pressures and growth rates below expectations

Instrument manufacturing revenues grew a modest 4% in 1991 to $1.8 billion. Instrumentation expenditures follow more of a regulatory and product development cycle than an economic one, contend manufacturers. Nevertheless, growth has slowed considerably over the past two years

New regulations will continue to provide markets for monitoring and analysis Recent stormwater regulations maintained sales for many manufacturers

About 57% of the market in analytical instruments is for laboratory use, estimates a report by Strategic Directions International Inc. (Los Angeles). Air analysis (24%), water analysis (12%), radiation and others make up the rest. The report also estimates that the U.S. represents about half of the total global market.

The 25 publicly traded companies selling water treatment/infrastructure equipment grew their revenues 8% in 1991 despite flat capital expenditurea by municipalities and very modest increases by industry. Construction costs make up more than half the expenditures in wastewater treatment systems (63% as estimated by a William T. Lorenz & Co. report) and much of these aren't counted in the $12.5 billion we estimate for segment revenues.

Equipment, chemicals, repair and specialized services represent most of the water infrastructure segment, but clearly much more is spent on water and wastewater management each year. A report by **Richard Miller & Associates** (Norcross, Ga.) puts the total market at over $30 billion, $6 billion for industrial capital expenditures, $12 billion for municipal capital expenditures, $5 billion for industrial O&M and $9 billion for municipal O&M. Obviously, a majority of these costs don't make it into the environmental industry.

Air pollution control is another equipment segment that has been flat recently as capital expenditure is postponed. Waiting for final Clean Air Act regulations is an even more significant factor in holding off the anticipated burst in market growth. Consultants have been the first to benefit, but equipment manufacturers, installers and materials providers all anticipate good times.

Utilities form roughly half of the U.S. APC market today, but new air toxics regulations will increase the market proportions of the chemical, surface coating and metal industries. APC is probably the most global of any industry segment (see EBJ, Nov.91), with the U.S. expected to increase its 30% of

FIVE YEAR INDUSTRY GROWTH

Industry Segment	Avg Ann Growth	Projected Revenue ($ Billions) 1991	1992	1993	1994	1995	1996
1. Analytical Services	6%	1.7	1.8	2.0	2.1	2.2	2.3
2. Solid Waste Mgmt	5%	27.4	28.5	30.8	32.6	33.9	35.3
3. Haz Waste Mgmt	6%	13.7	14.3	15.6	16.7	17.5	18.4
4. Asbestos Abatement	1%	3.0	3.1	3.2	3.2	3.2	3.1
5. Water Infrastructure	4%	12.5	13.1	13.8	14.5	15.0	15.5
6. Water Utilities	2%	11.8	12.0	12.3	12.5	12.7	13.0
7. Engineering/Cons	9%	13.4	14.3	16.4	18.0	19.4	20.6
8. Resource Recovery	10%	15.8	16.7	18.7	20.8	23.0	25.3
9. Instrument Mfg	6%	1.8	1.9	2.1	2.3	2.4	2.5
10. Air Pollution Control	13%	5.3	5.8	6.7	7.7	8.8	9.9
11. Waste Mgmt Equip	7%	11.0	11.6	12.7	13.7	14.6	15.1
12. Envmtl Energy	7%	2.0	2.1	2.2	2.4	2.6	2.8
Total:	7%	119	125	136	147	156	164
(Composite Annual Growth Rate)			4.8%	8.9%	7.4%	6.2%	5.4%

PRODUCTS, SERVICES AND CONSTRUCTION

Ordinary industries can be divided into two general categories, products and services. But the environmental industry merits the addition of a third category, construction. Construction can also be characterized as a one-time service or capital expense. In completing our second annual listing of top environmental engineering/consulting firms, it became apparent that our list compared apples and oranges and it made sense to attempt to isolate the construction component.

Hence we now list the top environmental contracting/construction firms as well as the top e/c firms (see p.3). This exercise, along with the ongoing task of reconciling our sell-side analysis of environmental industry revenues with the more universal buy-side analysis of environmental expenditures, almost led to the formation of a construction segment to our industry definition.

Construction projects are imbedded in other segments besides engineering/consulting. In fact, the vast majority of the revenues of our top construction firms fall into other segments. A portion of hazardous waste management revenues comes from remediation construction projects, all of which are counted in our industry analysis.

Air pollution control provides the most distinct example of construction revenues not finding their way into the environmental industry. Most estimates of expenditures associated with air pollution control last year were in the vicinity of $20-25 bilion but only a small percentage of those were equipment costs. Our estimate of $5.3 billion in revenues in APC include all the equipment, materials and specialty services associated with construction and maintenance of systems, not construction or consulting. A typical flue gas desulfurization project will include the purchase of equipment but a much more sizable expense in labor and construction is paid either to a variety of types of construction contractors or is even an internal expense for the purchaser.

Another frontier of construction revenues for environmental projects is facilities for manufacturing alternative products. Firms have already designed and built or modified plants for CFC replacements, MTBE (a replacement for lead in gasoline), alternative energy and a new generation of products is waiting on the drawing boards.

Perhaps even more compelling is the new generation of manufacturing facilities for all industries that will be built in the next two decades and the pollution prevention parameters that are becoming commonplace in design. Much of the specialized engineering going into all these projects will go the environmental companies but little of the construction dollars will. It is little wonder that a major trend in environmental services has been construction firms diversifying or buying into engineering/consulting and e/c firms adding construction capabilities. ■

the market to nearly 40% in five years.

Asbestos abatement suffered the most dramatic losses of any environmental industry segment in 1991. Industry revenues plunged 25%, and the revenues of EBJ's 13 still-consolidating publicly traded firms were down 14%. The recession had a major impact on the asbestos industry, notably discretionary jobs not associated with renovation or demolition. Weakness in the property market also delayed work associated with commercial renovation.

The number of players also showed a sharp decline, with the number of $250,000 businesses falling from 1,500 to 700, said Neil Wernick of **Rifkin-Wernick Associates** (Jenkintown, Pa.). Diversification into such areas as UST cleanup, indoor air pollution control and lead paint abatement has been on many lips for the last few years but pursued successfully by relatively few firms. In 1991 the much-talked-about market for lead paint abatement was about $900 million, but it's an opportunity that's not yet quite ripe, said Wernick.

This year the asbestos industry will show an improvement over depressed 1991 levels, maybe by as much as 20-25%, said Wernick. Olin Jennings of **The Jennings Group** (Chatham, N.J.) believes that the market is "alive and well," but he feels that "1992 should mark the beginning of emerging stability." The success of asbestos firms will depend not only on diversification strategies but, more importantly, on market position, financial strength and management decisions, said Jennings.

Waste management equipment serves as a catch-all segment for environmental products and technologies not specifically associated with water and air pollution control. The majority are purchased by generators but some are used in the waste management segments. Products include waste storage and containment units like drums, tanks and liners, and waste handling and compression equipment like protective clothing and heavy equipment. Products for spill response, indoor air quality, noise abatement and occupational safety are also included. The category with the highest growth potential may be environmental sofiware and information management systems.

Diversified Companies are defined as companies deriving a clear majority of their revenues from the environmental industry, but with a majority of those revenues not residing in a particular segment. Air & Water Technologies serves as a good example. In 1991 it completed its purchase of Metcalf & Eddy, the number 3 engineering/consulting firm, and maintained its ownership in Research-Cottrell, the number 1 seller of APC equipment in the United States last year.

Environmental industry giant Waste Management Inc., with revenues topping $7.5 billion, may yet migrate from segment 2 to segment 13. With links to Chemical Waste Management in segment 3, Brand in segment 4, SEC Donohue in segment 7, its own recycling subsidiary Recycle America and waste-to-energy leader Wheelabrator in segment 8 and National Seal, the no. 2 landfill lining company, in segment 11, Waste Management has nearly all the bases covered. No other company has cast its nets as wide as Waste Management, but no doubt more than a few business plans call for diversification.

Conglomerates continue to play an increasingly important role in the environmental industry, as evidenced by the growth of firms tracked in segment 14 of the EBJ Index. From eight companies two years ago to 17 last year and up to 25 major corporations today are listed. Originally we defined environmental conglomerates as multi-million dollar corporations with divisions or subsidiaries generating at least $25 million in environmental revenues.

Conglomerates own a number of top engineering firms, including Radian Corp. (no. 11 on our engineering/consulting list owned by Hartford Steam Boiler), Environmental Science & Engineering (no. 13, owned by Cilcorp) and United Engineers & Constructors (no. 5 on our contracting/construction list owned by Raytheon Co.). Publicly traded construction conglomerates include Fluor (no. 2 on our contracting/construction list), Dresser Industries (owns no. 3, M.W. Kellogg as well as the no. 5 APC equipment firm, Lodge Cottrell), Foster Wheeler (no. 4 and in the top five in waste-to-energy) and Morrison-Knudsen (no.7).

Other segments were also well represented. Alcoa controlled 41% of the aluminum can recycling market, and some paper manufacturers entered the waste paper business. Hewlett-Packard, Perkin Elmer and Varian are all significant players in the environmental instrumentation market. Corning owns Enseco, the nation's leading environmental testing business, with $82 million in revenues in 1991. Union Pacific owns USPCI, a $250-million hazardous waste management firm, and is one of a handful of railroad companies in the waste business, Conrail and Burlington being two other notables. Westinghouse has been making moves recently, selling its engineering/consulting subsidiary and going ahead with aggressive plans in the hazardous waste disposal, incineration and remediation construction businesses.

Chemical industry leaders Du Pont, Dow, Amoco, Rhone-Poulenc and others are leveraging their expertise into the hazardous waste business. Du Pont and Dow have contrasting strategies, however, for sudsidiaries that will both top $50 million this year. Ted Fischer, president of Du Pont Environmental Remediation Services, says that his company is mainly "servicing internal needs" and endeavoring to do project management at all Du Pont sites. Barry Naft, president of Dow's subsidiary AWD Technologies, says its goal is not to serve its parent but be a leader in the commercial market, also an eventual goal shared by Fischer. Both companies surely benefit from the technical expertise, capital base and R&D budgets of their parents.

OVER THE HORIZON

Last year was unpleasant for environmental industry executives, and the burning question remains: Was 1991 just a hitch in the growth curve, or a sign of times to come? How does the environmental industry as we know it fit into the "sustainable economy" envisioned by futurists and embraced by progressive policymakers?

The question that will determine whether we move in the direction of a more sustainable economy is, will our economic system ever fully value our ecological system? Environmental regulation is the first step in this long process. Internalizing environmental costs into the price of all our goods and services, however, will take more than just a politically popular "paradigm shift."

The writing on the wall is that the environmental industry will be folded into the strategic development of industry in general. The result being that some services will be absorbed and some will remain distinct.

The year 1991 will be remembered for its never-ending recession, but many companies anticipate a return to business as usual. Growth will, of course, pick up for environmental companies, as portrayed in the chart below. Results in 1991 were "a recession-induced blip," agreed Alan Farkas. In fact, there may even be a recovery-induced spike in the curve, but it is unlikely to be big or sudden enough to be noticed. There will be some releasing of pent-up demand, but only in those segments driven by compliance and liability like remediation and air and water quality. Farkas also agreed with our assertion that the environmental industry would, in general, be "a lagging indicator" coming out of the recession.

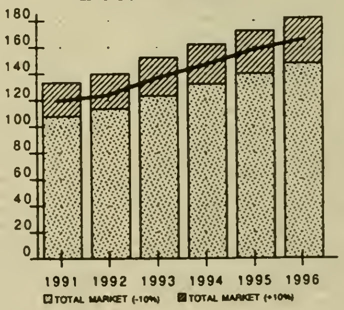
The environmental industry will make up for lost time, but forces are already at work that will contribute to a gradual deceleration in most segments. The charts on page 10 illustrate the leveling of net revenues in publicly traded environmental companies in the EBJ Index over the past three years. As mentioned these results aren't entirely attributable to the recession.

Now its time for the wake-up call. Look at the chart on page 11. It is the sum total of trend analysis in each of the 12 environmental industry segments. Whether or not the industry will measure precisely $173 billion in 2006, the chart illustrates the sobering fact that the market will inevitably diminish.

THE WRITING ON THE WALL

Remediation of existing sites, no matter how long the list, is clearly a

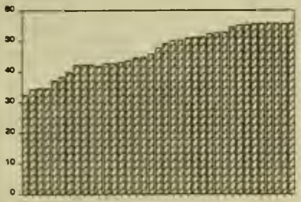
INDUSTRY GROWTH



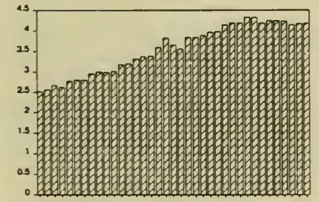
business with finite life cycle. Undoubtedly, new standards of cleanup or containment will also be hammered out and will influence the lifespan of the business. Does anyone really believe that the University of Tennessee's projected costs of $750 billion to remediate the nation's contaminated sites to current standards will be spent?

The remediation market will be strong for at least a decade and maybe two, but, like other cleanup markets such as asbestos abatement and underground storage tanks, it has to end sometime. We are making more USTs (albeit better structured and monitored), but we certainly aren't making much asbestos and, hopefully, not many more Superfund sites.

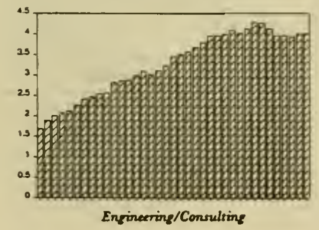
EBJ Index Monthly 4-Quarter Sales, 3/89-3/92



Environmental Industry



Hazardous Waste Management



Engineering/Consulting

Also affecting the **hazardous waste management** segment are the already diminishing volumes of hazardous waste to be managed. A number of large quantity generators have made immense strides in cutting waste flows by merely correcting design, operation and material inefficiencies that didn't account for environmental costs.

Northrop Aircraft Division (Hawthorne, Calif.) is one example of many companies from many industries that are in the midst of successful waste minimization programs. By mid-1991, Northrop reduced its hazardous waste by 50% from 1989 and aims for a 90% reduction from 1989 levels by 1996 while increasing production. Gary Freeman, Northrop's deputy for environmental management, admits that the first half of the reductions will be the easiest, most resulting from correcting what now appear to be glaring inefficiencies but were once standard operations. Large avoided disposal costs have kept management in support of going ahead with the more expensive waste minimization investments needed to achieve Northrop's goals, said Freeman.

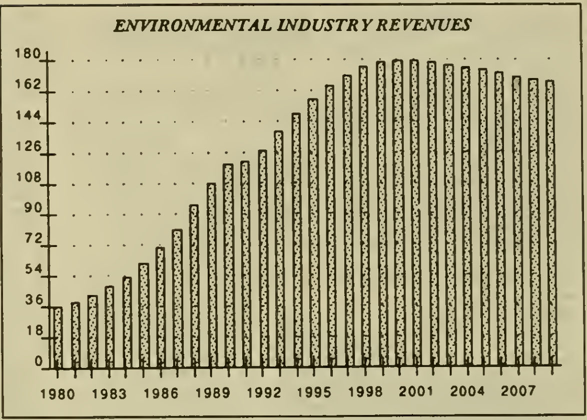
While Northrop is by no means unique, the majority of industrial companies have yet to make even the easy waste reductions, however, but these will increasingly reduce hazardous waste volumes available for commercial management in the next few years Off-site services will always have a market in the form of reclamation, recycling, incineration and to a lesser extent storage and landfilling, but the volumes available for commercial handling will be smaller. It is said that the manufacturing sector rebuilds its factories every 20 years, and the new generation already coming on line shows a significant decrease in waste output.

Hazardous waste management is an area in which new technology can hurt business for vendors, not only by diminishing waste volumes and facilitating alternative treatment, but by helping to internalize waste management for generators A buyer will choose to obtain a product to treat his own waste, particularly if it can be built in to a new facility, rather than incur the ongoing expense of hiring a hazardous waste management firm. It's no secret that disposal firms in both hazardous and solid waste have not been strong promoters of waste minimization.

Analyst Hugh Holman of **Alex. Brown & Sons** sees the 90s as the decade in which technology will significantly alter the hazardous waste industry. Besides the obvious trend towards avoiding the generation of pollution in the first place, Holman anticipates a shift from physical waste management to chemistry-based approaches, anticipating that the segment in 2000 will resemble the chemical industry more than the hazardous waste management business of today. Another trend is the "unbundling" of wastestreams as both technology and regulation increasingly target specific wastes.

By the same token, waste reduction will affect **solid waste management** firms, but reductions in volumes will neither be as easy nor as immediately apparent. A variety of studies, blinded to some extent by past numbers, project per capita generation of municipal solid waste to grow steadily over the next 20 years. EPA's numbers indicate that Americans generated 2.7 lbs. of MSW per person per day in 1960, growing to 3.8 lbs. in 1986 and 4 lbs. in 1990. EPA's projections for the future are for 4.4 lbs. in 2000 and 4.9 lbs. per person per day of MSW in 2010.

Not all those who look at the market agree. A recent solid waste report by **William T. Lorenz & Co.** (Concord, N.H.) states: "The actual growth rate in per capita generation, with all source reduction and waste minimization programs in place, could be even slower than forecast by the EPA. It is even conceivable that the daily generation rate could actually decline between now and the year 2000." We agree and even forecast a reduction in the rate in our 30-year model. Products and consumer habits are changing rapidly enough to reverse the trend in this decade. The United States currently generates *twice* as much MSW per capita than Germany, Japan, France or the United Kingdom.



ENVIRONMENTAL INDUSTRY REVENUES

Equally important to solid waste companies is the shift in how the waste will be managed. Landfilling peaked in 1985 at 83%, according to the Lorenz report, and the MSW management mix moved to 68% landfill, 17% waste-to-energy incineration and 15% recycled in 1990. By 1995 Lorenz predicts that landfilling will be down to 55%, waste-to-energy up to 22%, recycling up to 22%, with composting starting to play a role. The consensus top end for recycling is 25-30% of MSW. Some proponents believe that composting could eventually manage almost half the wastestream, but most projections put composting's share at 6-10% in 2000.

Many solid waste management companies have undertaken the shift to integrated waste management services by offering recycling and by increasing their interest in the waste-to-energy business. Although volumes of waste may not grow as many expect, prices to manage each unit volume will surely rise. Revenues in the solid waste segment will continue to grow, though portions of revenues of individual companies will gravitate towards resource recovery. In spite of maintaining revenue growth, the capital expense for industry leaders to create the infrastructure of integrated services demanded by the public and governments will show up in lowered earnings throughout the decade.

Companies in the post-consumer and post-industrial recycling side of resource recovery will benefit from the creation of another infrastructure: the one which uses recycled materials as a feedstock. Recyclers have been perpetually plagued by unstable demand, and thus unstable prices, for their material.

Paper provides a good example of the cycle recovered materials go through. In 1990 79 million tons of paper and paperboard products were produced in the United States, and 37% or 29 million tons of scrap paper was collected (6.5 million tons of this was exported). Old newspapers represented 6 million tons of the scrap paper collected in 1990 but only 1.8 million tons were bought by newsprint producers. At the time, operating mills in North America had the capacity to recycle only 3.6 million tons of old newspapers. No wonder it wasn't difficult for buyers to convince sellers of the "glut" and receive rockbottom prices.

The addition of recycling capacity has been dramatic recently, partially in response to oversupply, and an additional capacity for more than 3.7 million tons of old newspapers will be completed by the end of 1992. The pulp and paper industry is also slowly discovering that, once deinking and other equipment is capitalized, making recycled paper can save money.

State recycled content laws, however, will be the strongest long-term driver behind the addition of recycling capacity. Since most laws requiring certain percentages of recycled content are phased in stages into the next century, and virtually every state and possibly the federal government plans such measures, demand for paper looks likely to stabilize for recyclers.

Chemical recovery promises to be a mainstay of the resource recovery business, although it does not represent a large portion of its revenues today. Much of the business will be transferred from the hazardous waste management segment as reclamation technologies take hold for many hazardous wastestreams.

Revenues for the resource recovery segment should average double-digit growth well into the next century. As mentioned, a significant portion will be cannibalized from other segments, but the relative value of reclaimed materials will also increase appreciably.

Water infrastructure and water utility companies won't encounter diminishing demand for clean water but will reach a level of stable growth. The nation's infrastructure is in need of repair and this will continue to drive the market for equipment and specialty services. Construction of new treatment facilities has been flat, but an eventually upgraded Clean Water Act, along with more funding, will spur new secondary and tertiary treatment systems. New infrastructure projects for using reclaimed and gray water should also emerge in the next century. In the meantime, a number of equipment manufacturers should find receptive international markets as water quality issues penetrate the developing world.

Technical services in the environmental industry have historically been focused on righting the environmental wrongs of the past. We haven't made up for 100 years of industrial neglect in a decade and much work in waste management and cleanup remains, but there is only so long we can make up for lost time. Eventually the balance of work will shift to applying technology and services to mitigating future environmental problems rather than cleaning up old ones. It is up to the environmental industry to lead the shift or find itself being absorbed by industry rather than complementing it. ■

STOCK REPORTER

ST. PETER REVISITED

Deju Vu All Over Again?

A year ago, we suggested that the market was playing out its own version of "St. Peter: Who is going to heaven, and who is going to hell?" At the time, the first quarter's big run-up was over, and investors were beginning to be much more selective. The market seems to be playing a similar game this quarter, but with a slightly different twist. This time, the question seems to be: "Who is going to heaven, and who is staying in hell?"

A modest recovery is expected, but unlike the rising tide that raises all ships, not all companies are going to move up at the same time or at the same rate. The trick will be to identify those firms best positioned to take advantage of whatever increase in activity is available. Unfortunately, positive activity will be rare in the environmental industry. In industry groups identified in *The Wall Street Journal*, the pollution group fell over 10% in the first quarter, about three-quarters down the list of industries. We predict more of the same. As general economic activity picks up, activity in environmental segments will pick up, too, but with some considerable delays. Increased manufacturing will result in increased waste that needs hauling and recycling and will require more purchases of pollution control equipment to meet growing regulations. Government and industry budgets will take time to rebound, however, even when the economy recovers. Because environmental firms have been on lean diets lately, competition will be fierce for what business does come along, so profit margins and earnings will remain relatively weak into 1993

Exchange Index Comparisons

Exchange Indices	Current 03/31/92	Last Month 02/29/92	% Change in Period	% Change in 1992
EBJ Stock Index	3626.24	3837.31	-5.5%	-0.4%
Dow Jones Industrial Average	3235.47	3267.67	-1.0%	2.1%
NYSE Composite	223.25	228.21	-2.2%	-2.7%
Standard & Poor's 500 Stock Index	403.69	412.70	-2.2%	-3.2%
NASDAQ OTC Composite	603.77	633.47	-4.7%	3.0%

THE NUMBERS

A noble Roman was once told to beware the Ides of March. Based on the results for March, it would have been a good idea for environmental investors to avoid the entire month. All of the indices fell, but the EBJ Index fell the most. The EBJ Index fell 5.5% to wipe out the modest gains of the first two months. The EBJ closed the quarter down 0.4%. The NASDAQ OTC Composite fell 4.7% in March, but still managed a 3% gain for the quarter. The NYSE Composite and the Standard & Poor's 500 Stock Index both fell slightly over 2% for the month and ended the quarter down around 3%. The Dow Jones Industrial Average dropped 1% for the month and was up 2.1% for the quarter. These results prove a dramatic change from first quarter '91 when the worst performing index was up over 10% and the NASDAQ gained 30%.

Within the EBJ Index, Solid Waste Management took a nasty dive of 25.2% mainly on the accounting woes at **Chambers Development** (see Biggest Losers). The two Chambers stocks fell about 70% each. The bad news affected other solid waste companies, too. **Midamerican Waste** fell 26.2%; **Eastern Environmental Services** dropped 27.5%; and even industry giant **Waste Management** lost 12.3%. Hazardous Waste Management lost 15.8% on continued bad news at **Handex** (-41.6%); and large losses at **Tetra Technology** (-41.9%), **Quadrex Inc** (-34.9%), and **Tanknology Environmental Inc.** (-32.6%). Other segments weighing in with double digit losses were Analytical Services with a 11.9% fall and Asbestos Abatement with a 10.9% drop. Only Environmental Energy Sources posted a positive gain, moving up 4%, on the 45.3% jump of **Energy Conversion Devices** (Troy, MI) a producer of photovoltaic and battery products for environmental applications such as electric cars.

For the quarter, Asbestos Abatement gained the most by jumping 14.6% after being the only losing segment in 1991, dropping 15% for the year. Air Pollution Control, Resource Recovery and Energy Sources were also strong gainers. On the down side, Solid Waste dropped 22.4%, Hazardous Waste Management and Diversified Companies fell 9.7% and 8.6%, respectively.

SEGMENT GAINS - 1ST QUARTER

EBJ Segment	% Change
Asbestos Abatement	14.6%
Air Pollution Control	12.3%
Resource Recovery	10.4%
Environmental Ener Source	6.1%
Waste Management Equip	4.1%
Conglomerates	3.9%
Analytical Services	3.7%
Water Infrastructure	1.9%
Engineering/Consulting	-1.1%
Instrument Manufacturing	-1.2%
Water Utilities	-2.8%
Diversified Companies	-8.6%
Hazardous Waste Mgmt	-9.7%
Solid Waste Management	-22.4%

IPOs and M&As

The much anticipated initial public offering (IPO) by **Dames & Moore** (DMOR) came out in March. The environmental engineering/consulting firm offered 5.75 million shares. Dames & Moore (Los Angeles) raised $46.8 million from 2.5 million new shares and selling investors received proceeds from the sale of 3.25 million shares. The company did not receive any of the proceeds from the selling stockholders.

The success of the offering spoke to the "caliber of Dames & Moore" and its "geographical and technical capabilities" according to Analyst Jeffrey Berg of **Raymond James & Associates Inc.** The offering was dubbed the largest in the environmental industry and was closely watched by investment firms hungry to take other companies public. Berg said that while the "hurdles are getting higher" for companies looking to come out, because of past disappointments and the current economic pressures, "class acts" like Dames & Moore will keep the investment community open-minded. Robert Perry, Dames & Moore's CFO, echoed those sentiments when he said the market "saw the firm of Dames & Moore with its 53 years of experience and recognized a difference." A "substantial balance sheet before the IPO" helped, too, he noted.

In registration statements filed with the Securities and Exchange Commission, Dames & Moore reported that it has 117 offices worldwide, with 40 outside the U.S. Gross revenues were $323.6 million for the latest full year reported, ended March 1991. About 70% of the firm's revenues consist of environmentally related activities, and 11% of net revenues are from work performed outside the U.S. After the offering was completed, the approximately 90 people who had held equity in the limited partnership retained

Environmental Industry Summary

Industry Segment	Price 03/31/92	Last Month 02/29/92	Percentage Change	32 Week High	52 Week Low	4 Quarter Sales (10^6)	Market Value	Intrinsic Price *
1. Analytical Services	23.11	26.23	-11.9%	28.52	16.86	47.30	177.90	3.76
2. Solid Waste Management	226.44	302.71	-25.2%	375.28	178.05	14409.20	26781.80	1.86
3. Hazardous Waste Management	275.43	326.95	-15.8%	452.69	201.57	4005.50	7791.10	1.95
4. Asbestos Abatement	55.02	61.77	-10.9%	82.16	36.40	752.40	579.70	0.77
5. Water Treatment/Infrastructure	553.74	565.00	-2.0%	663.30	393.77	6487.80	8339.80	1.29
6. Water Utilities	281.77	284.89	-1.1%	316.14	244.38	1695.20	2135.80	1.26
7. Environmental Engineering/Consulting	344.29	370.15	-7.0%	470.16	266.28	4317.70	3686.00	0.85
8. Resource Recovery	224.82	236.73	-5.0%	289.02	150.68	4534.10	5543.40	1.22
9. Instrument Manufacturing	168.07	173.95	-3.4%	218.89	122.78	1819.30	2411.30	1.33
10. Air Pollution Control	193.20	193.77	-0.3%	241.64	120.65	1245.90	1511.70	1.21
11. Waste Management Equipment	223.23	226.92	-1.6%	274.90	174.27	2014.50	3304.60	1.64
12. Environmental Energy Sources	65.03	62.55	4.0%	90.51	46.03	347.10	1111.20	3.20
13. Diversified Companies	99.01	107.89	-8.2%	139.88	83.63	2078.50	1839.80	0.89
14. Conglomerates	693.06	697.80	-0.5%	1047.66	694.32	135900.50	109916.40	0.81
EBJ Index Totals:	3626.24	3837.31	-5.5%	4690.76	2729.67	179655.00	175130.30	0.97

* Intrinsic Price (IP) = Market Value/4-Quarter Sales

TESTIMONY OF
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BEFORE THE
SUBCOMMITTEE ON ENVIRONMENT AND NATURAL RESOURCES
U.S. HOUSE COMMITTEE ON MERCHANT MARINE AND FISHERIES

FEBRUARY 25, 1993

Thank you Mr. Chairman and members of the Subcommittee for inviting me and the Environmental Business Council to testify today on how the government and private industry can cooperate to increase the export of U.S. environmental products, goods, and services. I want to say, on behalf of my colleagues in the U.S. envirotech industry, that we appreciate very much the interest of Chairman Studds and other members of the House Committee on Merchant Marine and Fisheries in both preserving our global environment and "growing" the U.S. economy, as President Clinton likes to say. We deeply believe that these two, related goals are compatible and that it is absolutely critical that we pursue them both, at the same time. Today's hearing concerns a set of proposals that, if adopted, we believe will go a considerable distance toward achieving these dual goals.

BACKGROUND ON THE U.S. ENVIROTECH INDUSTRY

The U. S. envirotech industry includes companies that manufacture products or provide services in the environmental and energy areas, as well as educational and research institutions. It has for some time existed in relative obscurity. Yet, in the United States, there are around 60,000 envirotech companies concentrated in as many as 15 "clusters" throughout the country that, in 1991, had revenues of $120 billion. We believe that the envirotech industry will have a critical and expanding role to play in the future in both protecting the environment and promoting economic growth.

The continuing development and adoption of less polluting and more efficient products, manufacturing processes and services is a critical strategy for accommodating, without irrevocably altering the planetary life support system, the doubling of global population and the fivefold increase in economic activity which has been projected by the mid-21st century. Industry analysts also project that the worldwide market for envirotech goods and services will grow by 51 percent, to $408 billion, by 1996. The U.S. world-class universities, vigorous environmental regulations, sophisticated high technology manufacturing and environmental service companies, and highly skilled labor force and capable management, all give us a significant competitive advantage in the industry. However, our dominant share of the global envirotech marketplace is slipping, and important opportunities are being missed. We must encourage environmental and energy technology innovation, improve its diffusion, and facilitate the export of environmental goods and services. Experience demonstrates that there is a close connection between the export of environmental services and the sale of environmental products.

Events of the past decade have created a wave of interest and enthusiasm for the future of the envirotech industry. But real obstacles will have to be overcome if we are to be competitive in this new global marketplace. The Environmental Business Council of the United States, ("U.S. EBC") which we have established in cooperation with The Western Governors Association and other environmental organizations throughout the country, will work on behalf of the U.S. envirotech industry to meet these obstacles and provide a critical central and informed voice for the industry. It will help firms increase access to the international marketplace and to the purchasers of environmental goods and services both in the U.S. and abroad, thereby maximizing business development dollars. It will work in partnership with the Clinton-Gore Administration (which has already shown interest in this initiative) and with state governments to develop a coherent and effective set of national policies and programs to support the development of the envirotech industry. It will provide networking opportunities for firms to pursue joint ventures and other business development opportunities abroad. By providing a central voice for the currently fragmented envirotech industry, equal to that of the growing worldwide competition, the U.S. EBC will aid the industry in building on its current dominance in the marketplace and maintaining its preeminent place over the next decades.

ORGANIZING THE U.S. ENVIROTECH INDUSTRY

In New England, the creation of the Environmental Business Council, Inc. ("New England EBC") in 1990 provided a forum for environmental businesses, academic institutions, and public agencies to collaborate in the promotion and development of business opportunities, both domestically and internationally. Across the country, similar organizations have also created important opportunities for the industry. The success of this approach has been demonstrated consistently by the track record of members of the New England EBC in developing business in both the domestic and international marketplace. The experience of the New England EBC, as well as the other associations from around the country, will serve as the cornerstone and catalyst for development of the national envirotech association. We believe that a nationally coordinated program of advocacy for the envirotech industry will succeed in taking advantage of this unique opportunity to forge a partnership between the envirotech industry and government.

A more detailed analysis of the envirotech industry, the envirotech marketplace, and relevant growth factors, as well as the objectives, milestones, and resource requirements of the proposed national envirotech association, follows.

STRATEGIC OPPORTUNITIES FOR THE U.S. ENVIROTECH INDUSTRY

Several developments have created a unique opportunity for the U.S. envirotech industry to expand, but there are obstacles to overcome first.

The Global Environmental Market

According to a number of experts who track the envirotech industry, the current dominance of U.S. companies is giving way to competitive pressures from European as well as Japanese environmental companies as the global envirotech market develops.[1]

The U.S. Congressional Office of Technology Assessment estimates the current size of the worldwide envirotech market at $200 billion based on studies prepared by The Organization for Economic Cooperation and Development. OECD projects that growth will reach $300 billion by the year 2000, making environmental protection one of the world's fastest growing industries.[2] Based on an analysis of 12 environmental

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1/ Charles Collins, "Europe Eyes Major Share in Global Environmental Market", Winslow Environmental News, Vol. 3, No.2 (November, 1992) Winslow Management Company, Boston, Massachusetts.

2/ Much of this industry is concentrated in the U.S., Germany and Japan, but it is now growing rapidly in other countries of the world.

sectors, the Environmental Business Journal (EBJ), a newsletter that tracks the U.S. industry, estimated the size of the 1991 worldwide market at $270 billion. EBJ projects a 51 percent growth in that market to $408 billion by 1996.

Grant Ferrier, the editor of EBJ believes the U.S., with about 44 percent of the world envirotech market, is large but exhibiting the slower growth typical of a mature industry. He estimates the U.S. share of this market will grow about seven percent annually until 1996, while environmental industries in other countries including Canada, Mexico, Latin America, Eastern Europe, and Southeast Asia serving the global market grow at double digit rates.

Over the next five years, Ferrier estimates the U.S. share of the worldwide market will drop from 44 to 40 percent, while western Europe's share will rise from 30 to 32 percent. Japan, which Ferrier estimates had about 8% of the 1991 global envirotech market, is projected to remain approximately at that level through 1996. Only a coordinated strategy for the envirotech industry will reverse this predicted decline in the U.S. share of the global market. We believe that a failure to act now may result in the loss of existing and future market share such as the U.S. has experienced in the automobile, consumer electronics, machine tools, textiles and other once powerful industries.

Long-term Market Trends

The global envirotech market is driven by a number of factors:

- Expanding population and economic activity which uses more resources and creates more pollution and waste;
- Increasing public awareness of environmental issues and demand for environmental quality;
- Heightened business concern about environmental liability, corporate image, and pressure from investors;[3]

3/ See generally Stephen Schmidheiney's Changing Course, MIT Press, Cambridge, Mass., 1992; Bruce Smart, Beyond Compliance, a New Industry View of the Environment, World Resources Institute, 1992; Lester R. Brown, State of the World, 1993, (esp. chapters 9 and 10); World Watch Institute, W.W. Norton, 1993; Columbia Journal of World Business, Corporate Environmentalism, Fall/Winter 1992, Columbia Business School, New York, New York, 1992.

- The linkage of trade and the environment, such as that occurring in the North American Free Trade Agreement (NAFTA);[4]
- Future multilateral trade negotiations, such as the General Agreement on Tariffs and Trade (GATT); and
- International agreements, such as the Montreal Protocol for Chlorofluorocarbons (CFCs), those adopted at the Earth Summit in Rio in 1992 and others that will be adopted as the extent of global environmental problems is better understood.

The initiatives adopted at the Rio Summit are especially important for their impact on the global environmental marketplace. Six action points resulted from the Rio Summit, at which 172 nations were represented. These action points were:

(1) to adopt Agenda 21, a comprehensive program for sustainable development;
(2) to direct the United Nations to establish a Sustainable Development Commission to oversee implementation of Agenda 21;
(3) to adopt the Rio Declaration, a non-binding statement of 27 broad principles for guiding environmental policy;
(4) to adopt a legally binding treaty to safeguard biological diversity and genetic resources;
(5) to adopt a legally binding treaty on climate change; and
(6) to adopt a statement of forest principles.

Collectively, the Rio initiatives and the other factors set out above will help shape the global business environment for the envirotech industry. These and other factors accelerate the demand for improved environmental management,

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4/ See Lally, Esty and Van Hoogotstratem Environmental Protection and International Trade: Toward Mutually Supportive Rules and Policies. Harvard Environmental Law Review, Vol. 16, 1992 No.2.

For the analysis of the gravity of the challenge facing the global environment see Our Common Future, Report of the World Commission on Environment and Development, Oxford University Press, 1987; Senator Al Gore, Earth In The Balance, Houghton Mifflin Company, 1992; Shridath Ramphal, Our Country, The Planet, Lime Tree, 1992.

which in turn creates the need for environmental goods, services, education, training, information and advice.

Over time, these forces and newer incentive-based regulatory programs will lead to new environmental regulations and a favorable climate for environmental investments will be created in many nations around the world. This will result in increased business for the U.S. envirotech industry if the necessary resources are mobilized so that the industry is able to (1) maintain and enhance its edge in many environmental technologies, and (2) identify and take advantage of the global opportunity that lies ahead for the sale of goods and services abroad. These business opportunities will also be realized by envirotech organizations establishing business-to-business relationships with decision makers from other nations.

Simply stated, economic opportunities will be created by the transfer of the experience and training and technology needed for sustainable development from those who have it to those who require it. The Rio Summit described this process as technology cooperation. It relies principally on private initiatives and depends in large measure on business-to-business relations between firms in the developed world with others in the developing world. This cooperation will be greatly enhanced by support and cooperation from governments and other institutions, including multilateral lending agencies, like the World Bank and the regional development banks, that are engaged in various aspects of development work.

The Competitive Advantage of the U.S. Envirotech Industry

Michael Porter of the Harvard Business School has described clusters of competitive industries, such as the envirotech industry, as a critical feature of national and international economic competitiveness in his important book The Competitive Advantage of Nations.[5] In this five year study of ten leading trading nations, Professor Porter concludes that competitive success is concentrated in particular industries and groups of interconnected industries termed clusters. A cluster is defined as "a grouping of industries linked together through customer, supplier or other relationships." Both manufacturing and service industries may be part of a single cluster, as are new industries which may develop upstream, downstream or in related fields. While clusters are defined functionally, they are often also found to

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5/ Michael Porter, The Competitive Advantage of Nations, Free Press, New York, New York, 1990 be concentrated geographically within a nation. To illustrate this principle of economic competitiveness I have included as Appendix B to my testimony the executive summary of a recent study of the Massachusetts economy prepared by Professor Porter and Rebecca Wayland of the Harvard Business School and C. Jeffrey Grogan of the Monitor Company, Inc., entitled "Toward A Shared Economic Vision for Massachusetts" This report represents an effort to integrate and extend the understanding of the Massachusetts economy in the context of a new paradigm for understanding competitiveness. I believe the analysis advanced by Professor Porter and his colleagues directly applies to our strategic vision of the competitiveness of the U.S. envirotech industry. I have also included, as Appendix C, a figure that depicts some of the "clustering" of U.S. envirotech business and industry.

While competition and rivalry between companies within a cluster is aggressive, that very competition, Dr. Porter notes, is mutually reinforcing. Information flows freely and innovation spreads rapidly through relationships among customers and suppliers, as well as through the informal information and social networks in which company employees exist. Further, institutions such as colleges, universities and public infrastructure adapt to cluster needs. As this aggressive competition continues, less productive and innovative industries in the cluster decline. "Through a cumulative process that often occurs over several decades, the state or nation becomes a unique repository of specialized expertise, technology and institutions for competing in a given field."

Another critical determinant of economic success and source of economic growth for a nation is having industries that compete internationally (and not just nationally) headquartered there. This is because the size and productivity of international industries determines, to a large part, the long-term growth prospects of purely national industries. Accordingly, international firms offer the greatest potential for long-term economic growth for the U.S. Their success in this endeavor depends upon their ability to compete against firms in the international marketplace. Thus, while the challenge is great, success and competition in the international markets has a profound impact on U.S. prospects for long-term economic growth.

The U.S. envirotech industry is precisely the kind of cluster of nationally and internationally competitive industries which The Competitive Advantage of Nations identifies as the driving force behind national economic development. Further, to the extent that U.S. envirotech companies can develop and compete in the global environmental market, they will tap the superior potential for economic growth that home-based international companies represent. Accordingly, the envirotech industry is a critical potential engine for U.S. economic development, as the Clinton-Gore Administration has recognized. However, to realize this potential, the industry must overcome the challenges which currently threaten its continued preeminence in this market. We believe that creation of a partnership of the industry and federal and state governments is essential if we are to meet these challenges and the envirotech industry is to realize its potential.

CHALLENGES FACING THE U.S. ENVIROTECH INDUSTRY

Access to International Markets

Many U.S. envirotech firms lack both experience and established customer bases in the international market. On the other hand, such firms often possess the environmental technology, the expertise, and the scientific and management skills needed abroad.

These factors present obstacles to American firms seeking to do business in the international marketplace. Some of these obstacles are:

- Many U.S. firms are reluctant to consider export prospects and voluntarily exclude themselves from new markets because they perceive exporting to be too risky, complicated or not profitable.[6]
- International firms and governments who might be customers are subject to different environmental laws and regulations than those prevailing in the United States.
- Nationalized enterprises, cartel-like organization, labor union participation, political and governmental influence, and difficulties in penetrating traditional networks of referrals and

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6/ William E. Nothdurft, Going Global, How Europe Helps Small Firms Export, the Brookings Institution, Washington, D.C., 1992 reciprocal trading patterns may in effect bar entry to American envirotech firms.

- Identifying and gaining access to key decision makers may often require social, commercial, political and personal contacts which new American entrants in foreign markets often lack.

- Learning how to effectively utilize the various trade financing mechanisms available from the Department of State, Commerce, USAID, EPA, Export-Import Bank, and others, is difficult and time-consuming.

- Putting together the full package of goods and services that potential customers need may require teaming up with other suppliers. U.S. firms with expertise in a particular area of environmental services will often need to provide complementary services (for instance, education and training, which could be provided in co-ordination with an academic or governmental training institute) in order to provide effective and useful programs in a foreign context. Moreover, U.S. firms will be in competition with business firms and governmental enterprises from other countries seeking to sell environmental goods and services abroad, sometimes in an integrated, well-funded, "team" approach.

- Access to foreign firms and governments is often best obtained through centralized "official" trade associations, particularly in Latin-American and Eastern European countries with a history of centrally organized states.

- In many cases bureaucrats will either have sole control or a veto over purchases of environmental goods and services. Thus, close personal contacts will often enhance success.

The envirotech industry needs a central voice to address these problems. Moreover, the Clinton-Gore Administration has indicated its interest in using environmental exports as one of the critical industries for economic growth and the generation of new jobs. However, if this interest is to bear fruit the private sector must organize itself so it can effectively shape government policies and programs.

Technological Competitiveness

According to the World Resources Institute[7], many industrial countries are now devoting larger amounts of R&D resources to the search for new environmental technologies, not only to solve environmental problems at home but also to strengthen the competitive position of their industries internationally. In the United States, however, where national security has dominated the technological agenda for half a century, public priorities have been slower to shift. Despite the U.S. head start in environmental protection and technology, Germany, Japan, and other Organization of Economic Cooperation and Development (OECD) countries have gained an edge in many environmental technologies - air pollution equipment, for example. In these countries, industry and government often cooperate in developing advanced technologies, including those with potentially critical environmental advantages.

Many in the envirotech industry believe that their technological progress is being impeded by a lack of direction in public policy. Many also believe that government regulatory policy often inhibits innovative solutions. We believe, however, that there are two additional factors which inhibit the envirotech industry's ability to maintain and improve its competitive advantage.

First, the lack of a long-term technology development vision in U.S. environmental policy casts a fundamental uncertainty over investment strategy in U.S. industry and has erected barriers to environmental technology innovation.

An extensive study published in 1991 by EPA's Technology Innovation and Economics Committee concluded that the barriers in state and federal environmental and compliance policies are slowing technology innovation for environmental purposes. The study, which involved public and private sector stake holders, recommends major areas for improvement and concludes that fundamental changes to the environmental regulatory system will also be needed to encourage technology innovation.[8] But innovation alone is insufficient if the opportunities for commercialization and environmental protection in the domestic

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7/ George Heaton, Robert Repetto and Rodney Sobin, Backs to the Future: U.S. Government Policy Toward Environmentally Critical Technology", World Resources Institute, Washington, D.C., June, 1992.

8/ Permitting and Compliance Policy: Barriers to U.S. Environmental Technology Innovation, Report and Recommendations of the Technology Innovation and Economics Committee. USEPA 101/N 91/001 January 1991.

and international markets are to be realized. A second factor is involved. Technology must be diffused. This is accomplished by the spread and adaptation of a technical idea following early commercial use. This can be accomplished by such activities as technical assistance, publications, training, licensing policies and other technology transfer programs. A clear government policy must be adopted and implemented for improving technology diffusion. In a recent study, EPA's Technology Innovation and Economics Committee concluded that the environmental regulatory system could expand environmental progress and improve economic competitiveness if processes that diffuse environmentally beneficial technologies are used to effectively complement regulations. The report makes several important policy recommendations including, among others, making diffusion an EPA mission by building relationships with industry, supporting research and expanding support for the international diffusion of environmental technologies to help meet U.S. environmental and competitiveness objectives.[9]

The U.S. EBC can play an effective role in encouraging and facilitating innovation and diffusion of environmental and energy technology. Fortunately, some American leaders in and out of government are beginning to address these technological and economic challenges. Moves are afoot in the U.S. Congress to create national initiatives to support environmental research and development and to stimulate technological advances. If properly designed and implemented, with strong input from a national industry association, such initiatives could give the U.S. envirotech industry a major economic boost.

Effective Promotion of the U.S. Envirotech Industry

The U.S. envirotech industry is not currently well-organized. Typically, existing U.S. environmental industry associations are either centered on sectors of the industry (e.g., Air and Waste Management Association, Hazardous Waste Action Coalition, Water and Wastewater Equipment Manufacturers Association), or are geographically localized (e.g., the Environmental Business Council, Inc. in New England., California Environmental Technology Partnership, Oregon Environmental Technology Association, Washington Environmental Industry Association and other organizations being formed in New Jersey and Maryland). This sectoral and

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9/ Improving Technology Diffusion for Environmental Protection, Report and Recommendation of the Technology Innovation and Economics Committee. USEPA 130-R-92-001, October 1992.

geographical organization has hampered efforts to address technology development and increase the export of envirotech goods and services. Especially at the national level, a coherent and sophisticated single voice is needed to assist the U.S. envirotech industry to compete in the global marketplace.

Services represent a significant part of the envirotech industry and they also represent a large proportion of the potential global market. We believe there exists a strong relationship between the export of environmental services and the sale of environmental products. That connection may be illustrated by the sale of environmental engineering and consulting services abroad. This often leads to a service order specifying a U.S. environmental or other sector product for use in a proposed project or facility. Usually the service provider's staff is familiar with the product by reason of written or other reports or recommendations or by actual experiences with the equipment. Thus, successful international environmental service providers can "pull through" sales of environmental and other products from the U.S. companies. There are other service/product relationships which should be encouraged as well. These include the sale of environmental products which can lead to a demand for services. An example would be a post sale need for specialized environmental software for computers, or for insurance or trade financing.

Nowhere is there a national environmental trade association dedicated to promoting the interests of this burgeoning industry. The creation of such an association would help represent the nearly two million Americans whose livelihoods depend on the envirotech industry and would help give voice to the "jobs" side of the "jobs and environment" equation.

It is the responsibility of government as a partner in this envirotech venture to organize the various departments and agencies of the federal government to support environmental technology development, innovation diffusion, and the export of environmental goods and services. It is, however, the responsibility of business to create, organize, fund and manage the national environmental industry trade association which is needed to achieve these goals. Both must cooperate to fund and conduct the necessary research about the industry, the global markets, and the other activities, including training and information transfer, needed to achieve these goals.

LOCAL AND REGIONAL ENVIROTECH ASSOCIATIONS AS MODELS

The New England EBC

The New England EBC, like the other local envirotech industry associations whose members are sponsoring this initiative, is an association of environmental and energy firms organized to foster the development of an effective and competitive envirotech industry and to enhance and maintain a clean and productive environment. The New England EBC is one useful model for demonstrating the structure, goals, and benefits of a national envirotech association.

The New England EBC provides active membership programs, including networking, domestic business development initiatives, international trade opportunities, and education and technology transfer. It is also engaged in research about the regional envirotech industry.

The Board of Directors includes principals and senior executives of companies from various industry sectors, as well as representatives of educational institutions and law, accounting, venture capital, and financial service firms. There are close to 200 member organizations representing all sectors of this diverse industry. Although most firms are from Massachusetts, the New England EBC has attracted members from other New England states and from Eastern Canada.

New England EBC's mission is to bring member organizations together with public and private sector organizations throughout the world, in order to promote business development and resource protection and modern environmental management for industry and government. To carry out its mission, New England EBC conducts member activities and has organized committees which offer programs ranging from seminars on human resource issues to international business development. In addition to monthly member meetings featuring important speakers, committee meetings, seminars and workshops are conducted regularly. Committees include: business development, communications, education/technology transfer, energy, human resources, international trade, marine science and technology, membership, and public affairs.

New England EBC has developed close working relationships with officials in both state and federal government, as well as leading organizations in the public and private sectors. It has achieved a reputation as a highly credible trade association.

The Agreement of Cooperation which the New England EBC recently entered into with Mexico's industrial trade association, CONCAMIN, illustrates how an organized U.S. envirotech industry can collaborate with industry in other nations in developing new market opportunities within the context of the international movement toward sustainable development. Under this agreement (which New England EBC entered at the invitation of CONCAMIN) the New England EBC assists CONCAMIN and its member companies to implement modern environmental management through information transfer, educational programs, training, and technology cooperation between New England EBC and CONCAMIN member companies. By the end of 1992, nearly $100 million in contracts for new business had been committed or was under proposal. New England EBC is currently working to replicate this Mexican initiative in Canada, Latin America, Poland, and Eastern Europe.

Oregon Environmental Technology Association

The Oregon Environmental Technology Association (OETA) was founded in 1991 to more effectively address the unique opportunities and challenges facing the environmental industry. OETA is committed to providing effective and responsible environmental management, products and services that enhance economic and business objectives. OETA is committed to working with other organizations in establishing the Northwest and the United States as the world's primary supplier of environmental goods and services.

OETA has worked actively with the Pacific Northwest Economic Region (PNWER, an organization of five Northwest states and two Canadian provinces founded in 1989) which has recognized that the region, like New England, California, and other geographic clusters, has the critical mass of envirotech companies, academic and research institutions, and the existence of state and regional regulations and policies that support an active and effective environmental industry sector. PNWER has been pursuing a well-articulated goal to establish the region as a primary supplier of environmental expertise, goods and services. Situated on the Pacific Rim, the region is well positioned to serve the increased demand for environmental infrastructure, services and technology in some of the world's most rapidly industrializing economies of the world (Asia, Mexico, and Latin America). OETA, PNWER, and other environmental and trade organizations in the Western U.S. are actively pursuing collaborative efforts to increase the international competitiveness of the region's envirotech industry.

THE ENVIRONMENTAL BUSINESS COUNCIL OF THE UNITED STATES

We believe that a national envirotech industry association will materially enhance the effectiveness of these emerging regional associations and others that are now in the early stages of formation.

Mission

We have established the Environmental Business Council of the United States, Inc. (U.S. EBC). The goal of the U.S. EBC is to provide leadership in fostering the development of an effective and internationally competitive envirotech industry, for the purpose of helping to protect the environment through environmentally sustainable economic development. It will support the U.S. envirotech industry in several ways:

Increase access to international markets and to buyers of envirotech goods and services, both in the U.S. and abroad. U.S. EBC members need help in overcoming the expensive and time consuming obstacles to doing business in the international environmental marketplace. In many countries, personal relationships, comprehensive solutions, and contacts through an official trade association are required. Through U.S. EBC research, information, contacts, and trade missions, members will have access to the critical purchasers of envirotech goods and services. Members will also be able to compete on a level playing field with Western European and other competitors as part of a commercial, governmental, and academic team. Through EBC trade conferences, shows and expositions, and cooperative public/private export development programs, members will have access to key environmental managers, public and private. This access to potential customers will assist in understanding the market for envirotech goods and services and what improvements and changes customers would like to see. U.S. EBC will help envirotech firms maximize their business development expenditures in the domestic and international market place.

Promote U.S. national and state policy favorable to the development of the envirotech industry. The U.S. EBC would provide a currently non-existent central voice to help its members work with federal policy-makers to achieve a coherent and useful set of national policies, institutions and programs supporting the U.S. envirotech industry. Tax policies, market based environmental controls, export financing, official development assistance for environmentally critical technologies, and other government programs all need to be made more useful. The U.S. EBC would be a strong voice in

Washington and the state capitals in legislation, policy development, and program implementation. It will also organize meetings involving its members and key government decision-makers for this purpose.

Spur networking of companies to support joint business development. U.S. EBC will create an opportunity for active personal networking of envirotech firms which would more efficiently support the organization of joint ventures where cooperation is the best strategy for gaining business. It would also facilitate collaborative efforts towards providing a full range of environmental goods and services, training, education and information to public and private environmental managers, the buyers in the domestic and global markets. The U.S. EBC will also help members understand what the competition is doing. The U.S. EBC membership directory, newsletter and trade magazine will be valuable resources for these purposes.

The National Envirotech Conference

We propose to launch the U.S. EBC at a National Envirotech Conference to be held in Washington, DC in June of 1993. The National Envirotech Conference, which will be an annual event, will bring together industry and other leaders from the public and private sector nationally, including key federal administration officials, legislators from the U.S. Senate and House of Representatives, state government officials, UN officials engaged in global oversight of the implementation of Agenda 21, leaders of the Sustainable Development Commission, and other national and international organizations engaged in working through the implications of sustainable development. We propose a highly visible conference to be attended by invited representatives from envirotech organizations, private sector leaders, academic and research institutions, environmental regulators, and financing organizations. We believe that in succeeding years the National Envirotech Conference will become a critical forum for the industry, for environmental managers, and other public and private interests seeking information about environmental goods and services, education, training and information.

The International Environmental Business and Technology Institute

A genuine working compact between government and industry in this area requires the establishment of a "switching gear" entity to bring the two together. Such an entity -- whose working title is the International Environmental Business and Technology Institute, Inc. -- will act as a "go-between" in various areas where government and the private sector must coordinate efforts. Among these functions, this Institute would:

- encourage or coordinate the transfer and diffusion of appropriate environmental technology between government organizations and industry.
- collect and disseminate technical and market analysis to potential U.S. envirotech exporters.
- provide guidance to the U.S. and state governments on appropriate policies to support the industry's development and access to business opportunities and for education, training and finance programs to encourage the demand for U.S. environmental goods and services.
- identify target country and area needs for U.S. environmental goods and services.
- identify U.S. businesses to meet those needs.
- assist industry on a regional basis in export development.
- enter into contracts with UN agencies, the World Bank and multilateral lending banks.
- sponsor training and education programs for foreign nationals in their home countries or in the U.S.
- Advise the U.S. and other nations on the development and implementation of environmental regulatory programs and compliance strategies.

Organization

The U.S. EBC will be a national association with offices in Washington, DC. It will charter existing environmental industry associations or new local or regional chapters organized in regions of the country having clusters of envirotech organizations. U.S. EBC will be governed by a Board of Directors of appropriate size, including representatives of relevant areas of the U.S., envirotech industry segments, and chapters. Committees and panels of advisors will be established. Major conferences, trade shows or annual events would supplement the regular activities of the U.S. EBC.

The U.S. EBC will be future, nationally and internationally oriented, steering clear of matters of regional or local significance best left to its chapters, individual companies or other trade associations. It will work to be recognized -- at both the U.S. and the international levels -- as a voice for the common good and to shape the coordination of economic development and environmental protection in the United States and globally.

The Federal Role

We believe affirmative legislation addressing the subjects enumerated in your invitation to testify is necessary if we are to realize the full potential of the global market for environmental goods and services.

In addition to the various other recommendations I have discussed earlier in this testimony, including those relating to technology innovations and diffusion, the following actions at the federal level should be taken:

1. EXPORT ENHANCEMENT ACT -- In the short term, to support the export of environmental products and services, recently enacted legislation should be quickly implemented. For example, the environmental trade promotion provisions (Title II) of the Export Enhancement Act of 1992 (Pub. L. 102-424) should be carried out. In particular, the "Environmental Trade Promotion Working Group" created by this legislation should be established among the designated federal officials and charged by the President through an executive order to prepare its recommendations to enable federal agencies to promote the export of environmental technologies, goods, and services. These recommendations may include regulatory changes, legislative proposals and other federal agency actions to help get existing technology to the right place at the right time.

A fundamental problem in the Export Enhancement Act, however, is its reliance solely upon federal officials for developing and implementing the recommendations to promote the export of environmental products and services. Industry participation is neglected. We believe that this problem can be remedied by the creation of a new national strategy, including new legislation, as described below. Nevertheless, we recommend that the provisions of the Export Enhancement Act be acted on as soon as possible, but in anticipation of the new legislation described here.

The provisions of the Export Enhancement Act providing for a range of "overseas services for exporters" of environmental products and services should be implemented without delay. Further, federal agencies implementing the Act must recognize that the export of environmental services is fully as important as the export of environmental products, and that the two categories are closely related. Unfortunately, this linkage has been ignored and the export of services has not been sufficiently supported. Our national trade policy should promote the export of environmental services on a par with environmental products, recognizing that the former often leads to the latter.

2. FREEDOM SUPPORT ACT -- In addition, the Freedom Support Act of 1992 (Pub. L. 102-511) provides substantial opportunities for the envirotech industry to participate in any program of economic assistance to the republics of the former Soviet Union that may be approved by the new Administration. Under this Act, environmental technologies, training, and education may be provided by U.S. business, non-profit organizations, and universities to these emerging democracies. $417 million has been appropriated to carry out the Act. We recommend that a reasonable portion of these funds be allocated to support providing U.S. environmental technologies and business and management experience to these countries. The Departments of State and Commerce should be required to implement these provisions of the Freedom Support Act as soon as possible.

3. MARKET-BASED INCENTIVES -- To promote continuing development of domestic environmental management programs, we endorse the adoption of market-based incentives to achieve environmental objectives. In addition, and in light of the fact that more than 30% of the U.S. envirotech industry manufactures environmental products, we urge the new Administration to support investment tax credits for envirotech industry investing in new facilities and equipment.

4. CLEAN FUELS POLICIES -- With regard to national energy policy generally, we support proposals that would increase energy conservation and efficiency and provide for demand-side management. Specifically, to support the development of new and cleaner energy sources and to reduce environmental pollution and to create jobs, we recommend policies and incentives to encourage the use of sustainable development fuels over the next decade: solar, wind, and geothermal.

ENACT NEW ENVIROTECH PRODUCTS AND SERVICES EXPORT DEVELOPMENT LEGISLATION

To ensure the participation of the envirotech industry in developing exports of environmental products and services, we propose enacting legislation providing the following:

* a comprehensive statement of federal policy to develop and support the export of U.S. environmental products and services, based upon the active participation by the private envirotech industry, federal and state agencies, institutions of higher education, and the public.

* a process by which the envirotech industry, federal and state agencies, and institutions of higher education and the public may cooperatively devise an appropriate national strategy to promote the export of environmental products and services addressing all environmental sectors (air, water, hazardous materials, natural resources, including coastal and water resources). This strategy could initially seek to maximize the opportunities for export development in target countries such as Mexico, Brazil, Turkey and Taiwan which are able to commit substantial resources to develop national programs of environmental management in the next decade. Next, and building upon the provisions of the Freedom Support Act, this strategy could include a plan to cooperate with the countries of the former Soviet Union and Eastern Europe in meeting their needs for new environmental technologies and management expertise through a variety of techniques (loans, joint ventures, etc.). Third, the strategy may link NAFTA-implementation legislation to specific actions by Mexico and the U.S. to secure substantial improvements in environmental management programs. For example, such legislation might require and support active, cooperative actions by national trade organizations such as the U.S. EBC and the Mexican Chamber of Industrial Organizations (CONCAMIN) to adopt new environmental technologies and management strategies to ensure compliance with Mexico's environmental laws. Fourth, this strategy could seek in appropriate ways to use both U.S. and international aid programs to developing countries to provide U.S. environmental products and services. Fifth, the strategy could seek authority for the Export-Import Bank to make low interest loans to assist the U.S. envirotech industry abroad in both developing and developed countries in carrying out joint enviro-business ventures. Finally, the strategy could include additional export enhancement measures (direct grants, subsidies, low-interest loans, loan guarantees, tax incentives, etc.) to support the export of U.S. envirotech products and services.

* modest funding for a period of five years to support activities by an independent, non-profit organization (the "International Environmental Business and Technology Institute") to be operated by the envirotech industry in cooperation with the federal and state governments (see earlier discussion of this Institute).

* creation of a volunteer Environmental Services Corps which could mobilize the energies and expertise of hundreds of Americans experienced in environmental technologies and management to assist in carrying out environmental projects and building the environmental management capacity in other countries.

In Appendix A, I have provided specific comments on the elements of the proposed legislation as outlined in your letter of invitation to testify in this hearing.

CONCLUSION

If we carry out the tasks that we have described in this document, we will have begun implementation of a comprehensive global strategy to develop the U.S. envirotech industry and to assist the world in achieving environmental protection and sustainable development. A partnership between the federal and state government and the U.S. EBC and its chapters will be forged to assist in the education and training of the envirotech industry to identify and exploit business opportunities across national borders.

THANK YOU, MR. CHAIRMAN

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Appendix A

COMMENTS ON THE PROPOSED NATIONAL ENVIRONMENTAL TECHNOLOGY AND BUSINESS COMPETITIVENESS ACT OF 1993

The Environmental Business Council strongly supports this proposed legislation. We believe that the legislation is essential to building an effective partnership between federal and state governments, the envirotech industry, and institutions of higher education in order to promote the export of environmental products and services. We also believe that the legislation will be entirely consistent with and supportive of the Clinton-Gore Administration's policy of encouraging the management of global resources for sustainable use and development. We would like to offer the following specific comments on elements of the proposed legislation.

1. We need a clear and strong statement of the national policy to support the development of the U.S. envirotech industry and to promote the export of U.S. environmental products and services. Although the Export Enhancement Act of 1992 took a significant step in this direction, this Act does not include the envirotech industry and other important participants in an active partnership with the government to promote exports. The proposed legislation can build upon what was achieved in the Export Enhancement Act.

2. The EBC believes that creating a single office in the Department of Commerce to coordinate the Department's activities

in promoting the export of environmental products and services will simplify what is now a complicated bureaucratic maze of different offices and agencies with partial responsibilities and authority in this area. We recommend, however, that the new office play the lead role in coordinating the activities of other federal agencies, in addition to the Department of Commerce, with respect to promoting the export of environmental products and services. Currently many agencies, including U.S.AID, the Department of State, and the Ex-Im Bank, share authority over the federal government's activities which would support the new program. Because the new program more directly concerns the responsibilities of the Department of Commerce, we believe that it should be located in DOC.

3. EBC has proposed that the envirotech industry be an essential participant in the development of a national strategy to achieve the goals of the proposed legislation. Currently the Export Enhancement Act addresses only the public sector and leaves out a critical role for private industry. The mechanism to put together this national strategy must provide for an active partnership between government and industry, and it must include a process to revise and update the strategy from time to time as we gain experience with what techniques are most effective and cost-efficient in promoting the export of environmental products and services. We cannot stress too much the need for private participation in this strategic planning process.

4. The Freedom Support Act (FSA) authorizes the establishment of American Business Centers (ABCs) in Russia and the newly independent states. Under the FSA, ABCs may be established in certain key locations to provide a range of technical services (e.g., communications, document preparation, and some market survey data/information) to support the activities of U.S. private business beginning to operate in these locations. These services are especially helpful during the initial period in which business begins to operate in new and unknown markets. The FSA's authorization language for the ABC Program ("up to $10 million") is imprecise, however, and the actual amount likely to be allocated by the U.S.AID to the ABC Program in the Department of Commerce will be considerably less than $10 million. Although the FSA also authorizes "environmental business" components of these centers, little funding will actually be available unless the Congress clearly states its intention that such funds should support the export of environmental products and services.

EBC supports the proposal that the ABC Program be strengthened and that DOC take the lead in operating such centers in locations where they can be of critical assistance to American businesses, including envirotech business.

5. EBC strongly endorses the proposal to establish the International Environmental Business and Technology Institute as a primary means to achieve the effective coordination of private-public initiatives to promote the export of environmental

products and services. We think that a reasonable structure for the proposed Institute is as a nonprofit, independent organization, with a national charter consistent with the goals of the proposed legislation, and a national board of directors. We believe that a modest amount of funding could support the activities of the Institute (as described in the Committee's proposed legislation document) in the early years, and that we could assess its effectiveness early on to determine its value to the government and the industry. In that regard, a "sunset" provision for federal support for the Institute would be appropriate. We also believe that the Institute could be associated with the strengthened American Business Centers Program in an effective manner.

6. The EBC has championed the creation of the Volunteer Environmental Services Corps as a potentially effective way to assist the economic development of the emerging republics of the former Soviet Union and developing countries generally. Our idea is to draw upon the experience of senior environmental professionals who would volunteer to serve stints in such countries working with ministries, state industries converting to private ownership and adjusting to market economies, businesses, and individuals. These professionals would offer advice and assistance on effective and efficient environmental management of businesses and resources. The program would be modeled in part upon the Peace Corps. Private industry could play a large role in initiating and operating the Environmental Services Corps.

Corps volunteers could be located in the ABCs as they are established.

7. EBC believes that an organized U.S. envirotech industry, in partnership with federal and state governments, can play a significant role in implementing such international agreements as NAFTA. EBC has already worked with Mexican industry to assist in the creation of a program of environmental management in Mexico (this program of cooperation is described in the EBC statement). We believe that the U.S. and Mexican industry can play a much greater role in ensuring the successful implementation of a program of responsible environmental management in Mexico, and EBC supports the proposal to link NAFTA implementation with measures to bring about cooperative actions between the U.S. and Mexico to achieve this goal.

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APPENDIX B

TOWARD A SHARED ECONOMIC VISION FOR MASSACHUSETTS

EXECUTIVE SUMMARY

On December 30, 1992, Professor Michael E. Porter and Rebecca E. Wayland, Harvard Business School, and C. Jeffrey Grogan, Monitor Company, Inc. released their report "Toward a Shared Economic Vision for Massachusetts." This report was the result of an independent, pro bono study begun in July of 1992 in collaboration with Challenge to Leadership, an initiative to promote cooperation among leaders from business, labor, government, education, religion, and community institutions in Greater Boston. This report represented an effort to integrate and extend the understanding of the Massachusetts economy in the context of a new paradigm for understanding competitiveness, to identify recent accomplishments toward achieving a shared economic vision, to catalogue current proposals, and to define a small number of priority areas for the coming year. Excerpts from the report are provided below:

The Competitive Advantage of Cities, States, and Regions

The central economic goal for Massachusetts should be to attain a high and rising standard of living for our citizens. Our ability to earn a high and rising standard of living in Massachusetts depends on our productivity, or the value of the output produced with every day of work and dollar of capital invested. To maintain and improve our standard of living, we must grow the productivity of the Massachusetts economy over time.

Productivity is not as much a function of what industries Massachusetts firms compete in, but how they compete in them. High productivity is not restricted to the so-called "high tech" industries but can be achieved in traditional manufacturing and service industries as well.

All industries contribute to determining the output per worker of the economy, but industries that compete nationally and internationally have far greater long-term growth potential. Their success in doing so, however, depends upon their ability to compete against firms across the nation and around the world. The ability of the Commonwealth's firms to be competitive in national and international industries thus has a profound impact on the prospects for long-term economic growth.

In more sophisticated industries, such as many of those in Massachusetts, the traditional sources of competitiveness have been superseded by the changing nature of international competition. Globalization has allowed firms to source factors in international markets or locate selective activities overseas to take advantage of them. Technological change has given firms the ability to eliminate, nullify, or circumvent weaknesses in factors.

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What determines prosperity today is the potential of a region's industries and entire economy to continuously upgrade. This means relentless productivity improvement in existing industries, through improving products or increasingly sophisticated processes. This means moving into more advanced segments that involve more sophisticated technology and / or command higher prices, and having the capacity to compete successfully in sophisticated new industries where productivity is higher.

Why are certain companies based in certain regions capable of consistent innovation and upgrading in particular fields? The answer lies in four broad attributes of a region, termed the diamond, that shape the environment in which its firms compete. These attributes, individually and as a system, most influence the ability of competitive advantage to be created and sustained:

- *Factor Conditions:* The presence of highly specialized pools of skills, technology, and infrastructure tailored to the needs of particular businesses that are continually upgraded
- *Related and Supporting Industries:* Capable local suppliers of those specialized inputs (such as components, machinery, and services) integral to innovation in the industry; competitive local companies in industries related by technology, skills, or customers
- *Demand Conditions:* The presence of sophisticated and demanding local customers who pressure firms to innovate and whose needs foreshadow needs elsewhere
- *Firm Strategy, Structure and Rivalry:* A local context that allows strategies and ways of organizing and managing that fosters innovation; individual and corporate goals that support sustained investment; vigorous competition among a group of local rivals.

The workings of these attributes lead to the formation of *clusters* of nationally or internationally competitive industries. A cluster is a grouping of industries linked together through customer, supplier, or other relationships. Both manufacturing and service industries may be part of a cluster, and are often closely interconnected.

Once a cluster forms, the industries which comprise it become mutually reinforcing. Aggressive rivalry in one industry spreads to other industries in the cluster through spin-offs or related diversification. Information flows freely, and innovation spreads rapidly through the relationships among customers and suppliers. Institutions such as colleges, universities, and public infrastructure adapt to cluster needs. Through a cumulative process that often occurs over several decades, the state or nation becomes a unique repository of specialized expertise, technology, and institutions for competing in a given field.

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A particular region or city can be the location of several different clusters of industries. These clusters will typically differ in their size and state of development, and the individual industries within them will differ in sophistication and rate of growth. Clusters of industries that compete nationally and internationally, then, are the driving force behind economic development in a state or nation. Their mutually reinforcing character energizes innovation, fosters upgrading, spawns new companies and new industries, and drives demand for local industries.

The Role of Government in Economic Development

Government inevitably plays an important role in economic development. The question is not whether government should set policies that affect industry, but what those policies should be. The effect of government on competition is best understood by examining the way in which its policies affect the diamond. Government policies can positively or negatively influence *individual parts of the diamond.* Government shapes factor conditions, for example, through its educational or infrastructure policies. Regulatory standards effect the sophistication of home demand. Tax policy influences the goals of individuals and companies. Antitrust policy affects the degree of local rivalry. Government policy also influences the *feedback loops through which the diamond becomes a system.* Policy towards education and training, for example, can make it easier or harder for local institutions to adapt to the needs of local clusters.

Many of the most powerful roles of government are at the state and local level, because many of the most important sources of competitive advantage are local. Policies at these levels can have a major influence not only on the general education system and generalized infrastructure but also on the ability to create specialized training, specialized technological capability in universities, and specialized infrastructure to meet the needs of local industries. At the same time, a myriad of state and local regulations affect industry in countless ways, while state and local tax policies influence goals and incentives.

Government has four fundamental roles in economic development. The first is to improve the quality and availability of the basic inputs that firms draw upon, such as human resources, technological infrastructure, physical infrastructure that applies to many industries, and capital. Modern infrastructure includes not only roads, ports, railroads and bridges, but also smart highways, efficient air service, and advanced telecommunications.

Second, government must create rules, regulations, and incentives that encourage innovation and upgrading. Through regulations, tax policies, antitrust enforcement, and many other actions, government policies influence the climate in which firms compete.

Third, government must build on and reinforce the formation of local clusters, both established and emerging. This leverages the investments of government and other institutions in building skills, research capabilities, and infrastructure, because they feed whole groups of firms and industries. *Government should work to encourage the upgrading of all clusters, not choose among them.* Every industry offers the potential for

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productivity growth, not just emerging or high technology fields. In Massachusetts, for example, footwear firms such as Reebok, StrideRite, Converse, New Balance, and George Keith have as much potential to upgrade by improving their technologies and skills as supercomputer firms do. *It is as important to revitalize, upgrade, and defend established clusters as it is to encourage new, emerging ones.* Government's role is to improve the environment in which firms compete. It cannot set strategies and create competitive industries--only companies do that. It cannot foresee successful companies, but it can help reinforce the success of those that emerge.

The final and most subtle role for government is to raise the sights of local firms, their managers, their other employees, and the region's citizens. Government leaders, with their public platforms, can help educate the public about the imperatives of international competition, highlight the challenges facing industry, and articulate an economic vision for the future. This sort of role for government — signalling the future — fosters economic upgrading.

State agencies should drive the implementation of these types of programs to the local level, and should encourage industry associations and local government entities to play a leadership role in identifying the needs of local businesses. Incentives should be created for *trade associations* to establish training and technology transfer programs of their own, and to bear joint responsibility for managing public programs.

The Role of the Private Sector in Economic Development

While government can help to create a favorable environment for competition, it is companies themselves that must ultimately achieve and sustain competitive advantage. To do so, they must recognize the central role of innovation and the uncomfortable fact that innovation grows out of pressure and challenge.

Companies must sell to the most sophisticated and demanding buyers; seek out those buyers with the most difficult needs; establish norms that exceed the toughest regulatory hurdles or product standards; source from the most advanced suppliers; and, treat employees as permanent in order to stimulate upgrading of skills and productivity.

An important part of a company's competitive advantage resides in its local environment. Companies must invest to upgrade the environment, both individually and through industry associations, by nurturing local suppliers, working closely with local educational and research institutions, taking an active role in improving the local infrastructure, and the like. Industry associations, ideally representing entire clusters, should serve as a focal point for factor creation, information gathering, and communicating with government.

In order to sustain competitiveness, companies must compete nationally and globally. They must not do everything at home, but should source raw materials and capital from wherever they are most cost-effective and locate activities abroad to source cheap labor for less skilled functions, gain access to foreign markets, and tap specific technologies. Yet companies must have a clear *home base*, which is the location of their core research, critical mass of sophisticated production, and strategic direction. This home base is where the essential skills and technology reside, where inputs and information sourced from global activities are integrated, and where the most productive jobs are located. Today, state and national prosperity is driven by the competition to attract and retain home bases rather than low skilled assembly plants or distribution centers.

The Performance of the Massachusetts Economy

This framework for understanding competitiveness provides a means for taking a fresh look at the Massachusetts economy, and examining the current downturn and the underlying competitiveness of the Commonwealth from a long-term perspective.

An examination of the recent economic performance of the Commonwealth shows that many of the current economic difficulties are the result of restructuring in local industries caused by unsustainable economic growth experienced in the 1980s. The bulk of this economic restructuring has been in local industries such as real estate, construction, and retailing, along with associated problems in the Massachusetts banks and S&Ls, rather than in Massachusetts companies which sell nationally and internationally. A disproportionate share of job losses during the recent recession have occurred in *local* industries which comprised approximately 51 percent of total jobs but over 70 percent of total job losses between December 1988 and December 1991. The adjustment in local industries was exacerbated by the difficulties of Massachusetts-based firms in defense and, especially, in the minicomputer industry. Despite their negative impact on the economy, the problems experienced by these companies are industry specific rather than a reflection of broader problems in the Massachusetts economy. Finally, the emergence of a national and then a global recession has further depressed economic performance across all sectors, particularly since the Commonwealth entered the recession earlier than other parts of the nation.

Yet in examining these three developments, it is important to recognize the continued strength underlying the Massachusetts economy. As measured by personal income and employment, the Massachusetts economy has proven extremely effective in achieving and maintaining a high and rising standard of living for its residents. Between 1982 and 1988, per capita personal income grew at the second highest rate in the nation. This growth is even more impressive given the already high level of per capita income, which ranked sixth in the nation in 1982. Even the recent economic slowdown has not undermined Massachusetts' leadership relative to other states in the nation. According to the Massachusetts Department of Employment and Training, in 1991 the average level of personal income was $22,910 -- 20 percent higher than the national average of $19,092.

Massachusetts businesses have also registered strong performance. Massachusetts is the headquarters location for over 300 public companies and has a strong tradition of developing new firms and even new industries. In 1991, twelve of *Business Week's* 100 best small companies were based in Massachusetts. Between 1981 and 1991, Massachusetts consistently accounted for over 4 percent of the companies in the *Inc. 500* list of the fastest growing medium-sized companies in the nation, and as high as 6 percent. Finally, between 1985 and the first quarter of 1992, 7 percent of the total number of companies making initial public offerings each year were based in

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Massachusetts. Massachusetts has maintained its strong performance in these areas even during the recession. This success in developing and growing new companies is particularly impressive given that the Commonwealth accounts for only 3 percent of the total U.S. gross national product.

Massachusetts is also the home to a wide range of nationally and internationally successful industry clusters. Significant clusters of industries based in the Commonwealth include health care, information technology, knowledge creation, financial services, travel and tourism, plastics, metal fabrication, printing and publishing, environmental products and services, marine products and services, specialty footwear, and others. The strength of Massachusetts clusters is illustrated most vividly by their performance in the recent economic downturn. The health care, information technology, knowledge creation, financial services, travel and tourism, metal fabrication, plastics, and printing and publishing clusters comprised 41 percent of total private employment in Massachusetts in 1991. Yet, they accounted for only 14 percent of job losses between 1988 and 1991. Massachusetts clusters are not only more robust than local industries in the face of the economic downturn but also support wages 27 percent higher than the Massachusetts private-sector average

Strengths and Weaknesses of the Massachusetts Economy

The underlying strengths and weaknesses of the Massachusetts economy can be best evaluated by combining an examination of broad economic trends with more detailed examination of industry clusters and individual companies. Collectively, these analyses present a picture of the distinctive strengths of the Massachusetts economy and our prospects for future growth. They also highlight areas of weakness that must be addressed.

Despite its current difficulties, Massachusetts is in a strong competitive position and already possesses most of the conditions necessary for national and global competitiveness in the coming decade. The sources of strength in the economy include the following:

- *Strong Educational and Research Capabilities.* The Commonwealth has world-class educational, medical, and research institutions that attract students, scientists, and experts who are at the leading edge of their fields. In 1990, the 120 colleges and universities located in Massachusetts educated 12 percent of the nation's Ph.D. students in computer engineering, 7 percent of those in electrical engineering, and 10 percent of those in mathematics. Fifty percent of all Nobel Prize winners in the United States have been affiliated with Massachusetts educational institutions. In 1989, 5.7 percent of all research and development expenditures were made in Massachusetts, almost double the Commonwealth's share of national GDP.

- *Highly Skilled Work Force.* The Commonwealth enjoys a unique pool of highly qualified professionals and highly skilled technicians. Massachusetts leads the nation in the percentage of adults with college degrees and ranks second in the percentage of residents with advanced degrees in science and engineering.

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- *Leading Positions in Emerging Technologies.* Beyond particular industries, the Commonwealth is on the leading edge of a number of emerging technologies which can drive growth and underpin the region's prosperity well into the future. The strong technology and skill base located here provides the flexibility to develop even more industries as new needs emerge.

- *Successful Industry Clusters.* Many of the core clusters in our state economy would be the envy of most nations. Growth forecasts by broad industry sector indicate that many are expected to be among the fastest growing sectors of the national and world economy. Moreover, industry clusters in Massachusetts have strong positions in both national and international markets. They tend to compete in sophisticated ways which place them on the forefront of innovation. Even in relatively low technology industries, our firms compete in the high end of their industry with advanced technological capabilities.

- *A Broad-Based Economy.* The diversity of industries in Massachusetts represents another important strength. The Commonwealth's economy does not rest on any one group of firms or industries, like so many other areas. It is remarkable in the sheer number of innovative, world-class companies, both big and small, located here.

- *An Attractive Place to Live.* Even beyond its position as perhaps the world's leading intellectual center, the Commonwealth benefits from a rich history, a strong cultural life, and rivers, lakes, mountains, and seacoasts that are among the most beautiful in the nation. These important attributes provide an important contribution to the standard of living in Massachusetts in attracting highly skilled employees and must also be ranked among its most valuable strengths.

While the Massachusetts economy is fundamentally strong, there are some important weaknesses to be dealt with. These include the following:

- *Upheaval in Two Major Massachusetts Industries.* Restructuring in the defense and minicomputer industries has left many of our highly skilled workers unemployed or at risk of being unemployed. We must pay close attention to the industry transitions that are occurring and ensure that displaced workers are retrained and reemployed.

- *Economic Disadvantage.* The existence of economically distressed citizens and economically distressed communities is not only a failure for all of us but also diminishes the state's economic and fiscal resources. Almost 11 percent of Massachusetts residents currently live below the poverty line and 15 percent of cities and towns have unemployment rates above 10 percent. Unless we address these problems, the only result can be social tension, lawlessness, and despair.

- *A History of Unresponsive Government.* The Massachusetts government has traditionally constrained the state's economic growth because it has too often been unsupportive of business needs. The effect on the economy is illustrated by past

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failure to gain consensus on important initiatives and the absence of incentives and support mechanisms for Massachusetts-based companies.

- *Poor Image with Business.* Massachusetts has historically been viewed as a difficult place in which to do business, both by firms located within the Commonwealth and by those based elsewhere. High taxes, a perception of excessive regulation that failed to take industry needs into consideration, and inconsistent government policies have created this perception, and have limited our ability to attract new businesses. Until recently, few initiatives were undertaken to counterbalance this image.

- *High Cost of Doing Business.* The cost of doing business in Massachusetts is higher than in many other states in the nation, particularly in terms of product inputs and labor. Many of these costs are indirect and undermine the ability of Massachusetts businesses to prosper with no offsetting benefits.

- *High Cost of Living.* The cost of living in Massachusetts has been consistently higher than the national average, particularly in the Boston metropolitan area.

Understanding our strengths and weaknesses allows us to see beyond our current difficulties and clearly evaluate our future prospects. The institutions, skills, and businesses resident in the Commonwealth are among the best in the nation. Yet we must also address problems as diverse as retaining the highly skilled workers in our defense and minicomputer industries, building the basic skills of our economically disadvantaged individuals, reducing the bureaucracy of our government organizations, and improving our image with businesses. To achieve these diverse goals, we need to develop an overarching vision which sets specific goals for the Commonwealth, builds on our unique strengths, and defines priorities and actions to overcome our weaknesses.

Toward a Shared Economic Vision for Massachusetts

In order to make good decisions about how to deal with today's problems, we need an economic vision, or a set of principles defining what kind of economy we want to have and the crucial steps required to get there. An explicit economic vision is essential to transforming a collection of discrete policy initiatives into a visible and compelling agenda for action. It will motivate and guide the private sector. It will guide policy formulation in the many disparate parts of government that affect the regional economy and help ensure their consistency. An explicit economic vision will shift the focus away from short-term actions to deal with the recession, many of which may be counterproductive, toward the steps required for economic growth.

There is growing consensus that a long-term economic vision for the Commonwealth should contain the following elements:

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1. *Technology and Innovation Capital.* Massachusetts should seek to become the technology and innovation capital of the world in science, information technology, health care, the environment, energy conservation, management and other important fields. Our manufacturing industries, from plastics to supercomputers, should be the most innovative. We should seek to be the most innovative competitor in services as well.

2. *Most Skilled Work Force Focused Around Local Clusters.* Massachusetts cannot be the world's technology and innovation capital unless it has the most skilled work force of any state. This must extend beyond our current strengths in science, engineering, and graduate trained professions to encompass our entire workforce. Our human resources base is built on Massachusetts' primary and secondary education system. Yet, general education alone cannot create a competitive economy. What is also needed is a work force with the specialized, industry-specific skills required to be world class in all our industries.

3. *Infrastructure for a Knowledge-Based Economy.* In a technology- and knowledge-based region seeking to compete globally, the fluid motion of people, products and services, information and ideas is crucial. The Commonwealth needs the transportation and communications infrastructure necessary to successfully compete in a global economy.

4. *Most Attractive Climate for Investment.* The capacity to innovate and upgrade requires investment, not only in tangible assets such as plant and equipment, but also in intangible assets such as research and development, training, and information systems. These intangible assets are increasingly vital to competition. Massachusetts has a proven track record in creating new companies, not only because of our science and technology but also because of our strong spirit of innovation and entrepreneurship.

5. *Fiscal Stability.* To create the best environment for investment, Massachusetts must have the goal of gaining and maintaining the highest credit rating of any state. This will restore and maintain confidence, lower our borrowing cost, and attract risk capital.

6. *Elimination of Economic Disadvantage.* Even in a prosperous state such as Massachusetts, we have the despair of economic disadvantage. There are individuals who are unemployed and have few prospects for employment because they lack the necessary skills. There are also areas, both urban and rural, which lack a productive economic foundation. We cannot count our economic vision a success unless we eliminate these areas of disadvantage.

7. *High Quality of Life.* Attracting and keeping the people to achieve our economic vision depends on making Massachusetts a desirable place for people and families to live and work. There is a tendency to think that the quality of life is disconnected from our economic agenda. Yet, a high quality of life is part of the standard of living. The states which provide the most successful bases for investment are the places where skilled people want to live and work. A high quality of life depends upon having affordable health

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care, low crime, a rich assortment of recreational and cultural activities, and a clean environment.

8. *National and Global Marketing.* We have taken the attraction of the Commonwealth for granted for too long. To reap the fruits of a competitive economy and reinforce it, we must begin to market Massachusetts more aggressively as a place to do business, a place to invest, a place to work, a place to study, a place to live, and a place to visit. We must also aggressively market Massachusetts products and services abroad.
9. *A Better Public / Private Organizational Structure for Economic Development.* All these steps will not be successfully implemented without a better organizational structure for economic development. There are disparate levels of government, economic development organizations, chambers of commerce, and trade associations in the Commonwealth which have similar objectives but are poorly coordinated and often work at odds with one another.
10. *Performance-Based Government.* In order to make our government organizations and public programs more effective, we must remake government. Government fails to deliver because government organizations do not clearly identify their customers and fail to understand customer needs; they do not measure their own performance and are not held accountable for meeting performance objectives. We should not reduce the services government provides, but work to improve the efficiency and productivity with which they are delivered.

We must progress simultaneously in all of these areas if we are to meet our economic and social goals. The areas are interrelated, and our competitiveness will be constrained by the weakest link. Without highly skilled citizens and a strong technological infrastructure to draw on, for example, even aggressive capital investments will not produce the desired outcomes.

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SUMMARY OF ELEMENTS OF THE ECONOMIC VISION

• **Technology and Innovation Capital**	– Support our nationally ranked schools, upgrade our local state colleges and universities and university research; tighten links between research infrastructure and industry; and speed technology transfer – Focus on cross-cutting technologies and research – Encourage educational specialization and establish university centers of excellence linked to local industrial needs – Tear down regulatory barriers to change – Re-conceive regulation as a tool to encourage innovation
• **Most Skilled Work Force Focused Around Local Clusters**	– Invest in early childhood education – Set high standards for our public education system – Create a work force with specialized industry-specific skills – Support policies which help better train and retrain our work force – Create incentives for companies to invest in continuing education programs
• **Infrastructure for a Knowledge-Based Economy**	– Support infrastructure which rapidly moves people, products, services, information, and ideas
• **Most Attractive Climate for Investment**	– Create a climate which supports aggressive and sustained investment – Support policies that encourage productive investment and direct capital to new companies – Banking regulation that fosters prudent business lending – Increase the total pool of capital available to Massachusetts firms
• **Fiscal Stability**	– Strive for the highest credit rating – Achieve balanced state budgets, stabilize fiscal policy, and work to pay down debt
• **Elimination of Economic Disadvantage**	– Create incentives for employers to hire the disadvantaged – Focus on disadvantaged areas — promote entrepreneurship and investment
• **Quality of Life**	– Make Massachusetts a desirable place in which to live and work through affordable health care, low crime, a wide assortment of recreational and cultural activities, and a clean environment
• **National and Global Marketing**	– Aggressively market Massachusetts to encourage competitors, suppliers and buyers in important industry clusters to locate here; increase and broaden our exports; promote investment; and encourage firms to remain and expand here
• **A Better Public / Private Organizational Structure for Economic Development**	– Encourage strong coordination between government, economic development groups, trade associations, and industry
• **Performance-Based Government**	– Improve efficiency and productivity in government – Put in place performance and service objectives and measurement systems – Privatize where appropriate

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Progress Toward This Economic Vision

Having outlined the elements of an economic vision, it is useful to measure our progress against this vision.

- *Technology and Innovation Capital.* There is a growing recognition that becoming a technology and innovation capital should be a real focus in an economic vision for Massachusetts. Massachusetts passed a research and development tax credit which is one of the highest in the nation. A number of industry cluster studies are well underway. Regulatory task forces have identified ways to streamline regulation. While there has been progress on the technology and innovation front, we must continue to work collectively toward world technological and innovation leadership. We must work to encourage and facilitate investment in laboratories and research facilities. We must apply our technological know-how to speed the process of technology transfer out of university laboratories and into the market place. We must also help our defense firms convert to, and successfully compete in, commercial markets. Dual-use technology and the retraining of our work force are high on the agenda to facilitate this transition.

- *Most Skilled Work Force Focused Around Industry Clusters.* Progress toward developing the most highly skilled work force has been mixed. The are a number of training initiatives underway in particular industries. The Massjobs Council is embarking on a significant initiative to restructure and improve our work force development system. But progress in terms of restructuring our educational system in Massachusetts has been disappointing. We need to come to early consensus in this area so critical to the future competitiveness of Massachusetts.

- *Infrastructure for a Knowledge-Based Economy.* On infrastructure related projects, the Commonwealth is already spending more than $1.4 billion in state and federal capital funds. In September 1992, the first section of tubing for the Third Harbor Tunnel arrived in Boston Harbor. The Artery Team has recently completed a redesign of the Charles River crossing which helps clear the way for a resolution of one of the last major hurdles in this complex and expensive project. There is still much more to be done to enable Massachusetts to have an infrastructure which supports our economy. We must continue aggressive investment in our transportation infrastructure, including a new airport, improved ports and railroads, and less-congested highways. We must also initiate a program to harness advanced transportation technologies such as smart highways and establish a regulatory strategy and incentives to create a world-class fiber optic and over-the-air telecommunication and computer network.

- *Most Attractive Climate for Investment.* Worker's compensation and estate tax reform were two significant steps forward over the past year. The Weld administration has put forward a thoughtful plan with the strong support of the business community to stimulate investment and job creation in the Commonwealth. This plan is currently under review in the legislature.

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– *Fiscal Stability.* There has also been much progress toward achieving political and fiscal stability. In one of the worst economic periods in the Commonwealth's history, the administration and legislature were able to successfully, and successively, balance the state's budgets without tax increases or new borrowing. Capital spending has been reformed with multi-year capital spending plans, a re-prioritization of spending, and the linking of capital spending to bonding. While we have seen significant progress in this area, we must not become complacent. Rising health care costs, and the effects of the local and national recession will continue to affect the state's revenues. It will be as important for the administration, legislature and private sector to work collectively and to make do with the funds available.

– *Elimination of Economic Disadvantage.* In addition to tax policy initiatives and programs to improve access to credit and capital, the Weld/Cellucci administration has also put forward a number of proposals designed to encourage employers to locate in economically distressed areas. While economically distressed areas within our cities and rural areas are a subject of significant focus in Massachusetts, we must also work to boost the chances for our disadvantaged citizens. Mayor Flynn's emphasis in this area, his focus on families and neighborhoods, and his efforts with Representative Kennedy for low income housing have been a good start, but a renewed emphasis on human resources strategy -- with a focus on education and training -- will do much toward improving our disadvantaged population.

– *High Quality of Life.* While the Commonwealth has led the nation in strategies for pollution abatement, we are behind other areas in our approach to market-based strategies. As part of an environmental and energy strategy, we should work collectively with the long-term objective of enabling Massachusetts to improve its environment and boost the competitiveness of its industries.

– *National and Global Marketing.* There has been a real change in mindset across government and business about th~~e marketing o~~f Massachusetts. The Governor's Council on Economic Growth and Technology in 1991 created a special task force on the promotion of Massachusetts. Informative, industry cluster-specific literature has been prepared and an advertising campaign is being created to promote Massachusetts. A number of trade missions have been completed and trade offices have been established overseas to extend the reach of Massachusetts around the world. CEOs across Massachusetts have joined forces to form the Massachusetts Ambassador Program to attract national and international companies to Massachusetts. The Commonwealth's leading utilities and economic development organizations have also formed an alliance to promote the competitive advantages of Massachusetts and provide a coordinated site finding capability for firms considering expansion or locating operations in the Commonwealth.

While significant strides have been made, much more can be done to shape the perceptions of those inside and outside the Commonwealth. We must encourage firms to remain and expand in the Commonwealth as well as encourage firms to invest here. Massachusetts has historically been able to attract individuals and firms. But the Commonwealth is now experiencing strong competition for our people and companies from other states and nations with sophisticated marketing and a

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plethora of financial and other incentives. We must continue to respond to this challenge with vigor and a well-coordinated public / private approach.

- *A Better Public / Private Organizational Structure for Economic Development.* The Governor's Council on Economic Growth and Technology has had an active and instrumental role since its creation in 1991. Comprised of leading executives and academics, the Council is organized into a number of task forces and subcommittees addressing such topics as tax policy, capital formation, technology policy, the promotion of Massachusetts as a place to do business, and defense conversion. Committees on biotechnology and pharmaceuticals and telecommunications have prepared reports for the Council highlighting industry-specific issues. Task Forces on advanced materials and marine science have recently been formed to do the same. The International Trade Advisory Board has also been formed to bring greater coordination between government and the private sector, spotlight trade issues, help to formulate policy to build exports by Massachusetts firms, and bring business investment into the Commonwealth. Within Greater Boston, *Challenge to Leadership* has served an important role by bringing together many diverse economic development efforts.

  Despite this progress, there still are many disparate levels of government, economic development organizations, chambers of commerce, and trade associations which have similar objectives but often work at odds with one another. A summit of economic organizations in the Commonwealth should be conducted in order to formulate a coordinated plan for increasing exports, encourage firms to remain and expand here, and attract new business to the region. Trade associations and job training organizations can also work with the administration to further identify where regulatory and other barriers impede growth and innovation and to identify what infrastructure needs and specialized skills will be required to compete in the future.

- *Performance-Based Government.* The last several years of economic restructuring have been painful. Many cuts have been required to balance the budget. The administration clearly has an agenda of re-examining the role of state government and pursuing techniques to promote efficiency. Beyond efforts to reduce the overall size of government and eliminate redundancy, a number of initiatives are underway, ranging from performance measurement and performance-based budgeting to benchmarking and best demonstrated practices.

Steps like these have given Massachusetts a head start and advantage in dealing with problems affecting every state. The tables on the following pages provide a more specific view of areas where progress has been made and where consensus for action is emerging. They also highlight areas in need of additional emphasis. Although there are undoubtedly many more areas where action is being taken by forward-looking groups, this early attempt to summarize initiatives across the state indicates an unprecedented level of activity, ideas, and agreement for improving our economic performance.

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SUMMARY OF ECONOMIC DEVELOPMENT INITIATIVES AND IDEAS — WHAT HAS BEEN DONE OR PROPOSED

• **Technology and Innovation Capital**	– Research and Development Tax Credit – AIM Regulatory Task Force – Kerry-Rudman Small Business Innovation Research Program – Industry cluster studies – Excellence in Innovation and Quality awards – Economically targeted investments with some of the state's pension funds
• **Most Skilled Work Force Focused Around Local Clusters**	– Massachusetts Jobs Council Training Initiative – Weld/Cellucci educational reform proposals – Senate and House educational reform proposals – Training initiatives in particular industries
• **Infrastructure for a Knowledge-Based Economy**	– $1.4 Billion in state and federal capital funds – Central Artery / Third Harbor Tunnel Project – Weld/Cellucci $100 Million Capital Projects Fund to stimulate economic growth – "Strategic Assessment Report"on Advanced Transportation – $1.5 Billion Logan Airport modernization program
• **Most Attractive Climate for Investment**	– Weld/Cellucci Economic Development / Jobs Creation proposal for: Capital Gains Tax Phase-Out, Investment Tax Credit Increase, Emerging Technology Fund, Small Business Capital Access Program, Export Finance Program – Workers' compensation reform – Estate tax reform – Reduced the state's personal income tax rate from 6.25% to 5.95%
• **Fiscal Stability**	– Balanced successive budgets without resorting to new borrowing or new taxes – Pursued stable tax policies – Instituted 5-year capital planning program – Re–prioritized capital spending
• **Elimination of Economic Disadvantage**	– Weld/Cellucci Economic Opportunity Area Proposals: Credit for Investment, Loss Carry Forward Increase, Export Tax Credit, Job Credit, and Building Re-Utilization Deduction – Mayor Flynn's initiatives in neighborhoods and disadvantaged urban areas
• **Quality of Life**	– Planned development of state energy strategy
• **National and Global Marketing**	– Governor's Council of Economic Growth and Technology's Task Force on Promotion of Massachusetts – Massachusetts Alliance for Economic Development – Massachusetts Ambassador Program – Weld/Cellucci Export Finance Program proposal – Trade Missions to Asia, Europe, the Middle East, and Latin America – Overseas trade offices in Japan, Germany, and Israel – Massachusetts Center for Technology Growth
• **A Better Public / Private Organizational Structure for Economic Development**	– Creation of the Governor's Council on Economic Growth and Technology and its Task Forces and Subcommittees – Creation of the International Trade Advisory Board – Industry mediators proposal – Massachusetts Development Agency proposal – Regional "one-stop shopping" offices proposal – October 1992 Manufacturing Conference – *Challenge to Leadership*
• **Performance-Based Government**	– Performance-based budgeting – Heightened attention to cost control

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ECONOMIC DEVELOPMENT PRIORITIES — WHAT REMAINS TO BE DONE

• **Technology and Innovation Capital**	– Develop closer links between schools, universities, research firms, and industry to optimize the state's intellectual capital and speed the process of technology transfer – Establish university centers of excellence linked to local industry needs – Eliminate and streamline regulations that negatively affect innovation and business development – Conduct studies of Massachusetts clusters to identify ways to improve the environment for innovation – Help defense firms convert to, and successfully compete in, commercial markets
• **Most Skilled Work Force Focused Around Local Clusters**	– Achieve consensus on educational reform – Restructure the job training system
• **Infrastructure for a Knowledge–Based Economy**	– Continue aggressive investment in transportation infrastructure, including a new airport, improved ports and railroads, and less-congested highways – Initiate a program to harness advanced transportation technologies such as smart highways – Establish a regulatory strategy and incentives to create a world-class fiber optic and over-the-air telecommunication and computer network
• **Most Attractive Climate for Investment**	– Increase the investment tax credit – Establish a long-term capital gains incentive – Establish investment incentives and capital access programs for small businesses and emerging technologies
• **Fiscal Stability**	– Institutionalize balanced state budgets – Reduce debt – Achieve an AAA credit rating
• **Elimination of Economic Disadvantage**	– Provide a comprehensive program for adult education in basic skills – Establish incentives for employers to hire the disadvantaged – Create a strategy for enhancing sustainable economic development in disadvantaged areas
• **Quality of Life**	– Develop an environmental quality and energy conservation strategy – Gain consensus on a strategy to provide affordable healthcare – Create a plan to improve recreational and cultural facilities
• **National and Global Marketing**	– Export promotion strategy – Conduct a communications campaign to herald Massachusetts' strengths and broadcast progress
• **A Better Public / Private Organizational Structure for Economic Development**	– Appoint industry mediators to coordinate business and government activities – Establish one-stop shopping for new businesses – Increase coordination among economic development organizations – Establish a regional strategy center for state economic development – Develop an on-going capability to assess the performance of the economy
• **Performance–Based Government**	– Establish performance standards and measure performance for government programs and offices – Privatize selectively

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Priorities for 1993 and Beyond

All would agree that the task of creating and implementing a shared economic vision for the Commonwealth remains unfinished. The first priority, in our view, is to make real progress toward restructuring the public education system in Massachusetts. While there are current proposals from the Governor, the House and the Senate, we are still far from a consensus both on how to restructure public education and on how to fund it. We need to find a way in the Commonwealth to break through the substantive and political complexities of making progress in this area, and agree on a strategy. The 1991 *Challenge to Leadership* report dealt exclusively with education, and it would not be appropriate to focus heavily on that issue here. Nevertheless, it remains at the top of the Massachusetts long-term economic agenda.

There are four other pressing priority areas for 1993. The first is *capital*, and how to enhance the supply of capital to Massachusetts industry. The second area is *job training*, where hundreds of millions of dollars are currently being spent in the Commonwealth with questionable results. The third is achieving *one-stop shopping*, or the need to coordinate the state's activities to attract new investment. The final area, which cuts across the other three, is the need to develop a comprehensive strategy to deal with *economically disadvantaged areas* within the Commonwealth.

- *Capital.* Massachusetts has a proven track record in spawning new companies and entirely new industries. Even in the current recession, new business formation has continued, and Massachusetts has a leading position on both the *Inc. 500* list of rapidly growing companies and in the rates of initial public offerings on Wall Street.

  Despite this success in new business formation, however, there is a widespread feeling that the availability of capital to fund both new and established companies in the Commonwealth is inadequate. Part of the difficulty may be temporary, and simply the result of the recession and the difficulties faced by Massachusetts banks in dealing with bad real estate loans. At the same time, the flow of capital into the Commonwealth has undoubtedly been hampered by the negative image of Massachusetts that resulted from the state's fiscal difficulties and the early onset of the recession.

- *Job Training.* To cope with heightened national and international competition, almost all agree with the need for greater and more effective training for the Massachusetts work force. While the Commonwealth's universities as a group are among the best in the nation, there are serious questions about our job system for vocational and technical training.

  It is estimated that more than $360 million is spent in the state annually on job training programs. However, these programs are distributed among four separate state agencies and numerous local entities, with apparently little coordination. Local regional employment boards have the authority to allocate all job training partnership funds and some state welfare money, but appear to vary greatly in their effectiveness. Moreover, the available funds often come with severe restrictions on

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their use, which limits their benefit to the economy. Massachusetts needs to develop a coherent state strategy for job training.

– *One-Stop Shopping.* There is intense competition today for business investment, whether it is expansion by established companies or attracting new companies into the region. States and foreign countries are using increasingly sophisticated and coordinated strategies to attract industry. Many states offer various kinds of subsidies to attract investment. This approach is often self-defeating, because it attracts cost-sensitive activities which make a lesser contribution to the state's economy and are prone to move when a better deal can be struck elsewhere. Whatever approach is used to attract investment, however, a coordinated approach by the various agencies of government is needed. This is often referred to as one-stop shopping, or the ability of an established or new company to go to one place to coordinate all its interactions with the state and local governments.

Massachusetts appears to be well behind in achieving this capability. Site selection services are not well developed and are poorly coordinated. State and local agencies have not coordinated their activities well. As a result, Massachusetts reinforces its image of being unfriendly to business, and loses plants and other investments that it could otherwise win. Massachusetts needs a comprehensive approach to providing one-stop shopping for industry, spanning state and local government.

– *Economically Disadvantaged Areas.* During the current recession and even before, some areas of the state were hit much harder than others. There are a number of economically disadvantaged areas both in Massachusetts cities as well as in rural areas. The need to address these areas of disadvantage is a matter of growing urgency in the Commonwealth and in the nation. Yet current approaches to dealing with this problem are achieving mixed results at best. Too often, it seems, public money is being funnelled into subsidies and incentives which result in uneconomic and unsustainable development in distressed areas. Much of the capital goes to real estate projects or to attracting companies with tenuous ties to the area without addressing the fundamental underlying problems of the local area.

Conclusions

This year's *Challenge to Leadership* conference brought together a wide range of community, business, labor, and government leaders. It provided a unique opportunity for these groups to discuss the elements of a shared economic vision for the Commonwealth, identify priorities for action, and highlight points of debate.

Through the conference discussions, there was widespread consensus that the future success of Massachusetts will be driven by a new economic era. The new model is one in which firms must compete in a global economy against the world's best rivals. Massachusetts will only remain prosperous if we can be productive, skilled, and innovative enough to keep up. In this new environment, business will not succeed by driving wages down. At the same time, traditional government policies such as heavy public assistance, and a focus on real estate development simply will not work.

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Consensus also seemed to emerge on the major elements of an economic vision for the Commonwealth: achieving a competitive economy that generates a high and rising standard of living for *all* residents. There was much agreement on the need for Massachusetts to improve skills, foster new technologies, upgrade infrastructure, increase investment, and the like.

The imperatives of this new global economy transcend many of the traditional differences among the groups represented at the conference. A wide range of speakers noted the close interdependence of economic and social goals. It became clear that policymakers and others can no longer see these areas as separate but must strike a careful balance in the resources and attention dedicated to both of them.

The greatest tension at the Conference surfaced over the tradeoff between making the investments needed for genuine, long-term economic prosperity and dealing with the pressing, short-term needs of our citizens. The benefits of balancing the budget and improving our state bond rating, for example, must be weighed against the need to reduce homelessness and poverty in the Commonwealth. Making these trade-offs requires a high degree of trust, which needs to be strengthened in the Commonwealth. Disadvantaged individuals must feel that their plight is understood and is being addressed if they are to tolerate further sacrifices. Business and government leaders must understand and act on these concerns if the needed political support for important changes is to be forthcoming.

Striking the proper balance between short-term economic and social objectives and long-term economic growth requires that the broad range of interests represented in Massachusetts operate under a shared vision for the Commonwealth. In the last several years, the challenges which we have faced have fostered unprecedented cooperation within government and between the public and private sector. The collective efforts of these groups have led to progress against many of our most pressing issues. Yet there is still much to be done. To continue to make progress toward our economic vision, we must reaffirm our commitment to the vision and continue the constructive dialogue that is already in progress.

Our most important task is to translate this emerging consensus into action. This report and the *Challenge to Leadership* discussion focused on five areas for action, including improving the educational system, increasing capital availability, restructuring job training, improving one-stop shopping, and eliminating economic disadvantage. Our hope is that the report and the conference will foster further discussion among the many groups in Massachusetts, and that even greater progress toward a shared economic vision for the Commonwealth can be made in future years.

"Toward a Shared Economic Vision for Massachusetts" was donated to the Commonwealth of Massachusetts and can be purchased for the cost of printing through the State House Bookstore, Room 16, The State House, Boston, Massachusetts 02133 (Phone: 617-727-2834).

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Testimony of
Thomas A. Campbell, General Counsel of ENTRIX
Before
The House Merchant Marine and Fisheries Committee
Subcommittee on Environment and Natural Resources

Mr. Chairman, members of the sub-committee, my name is Thomas A. Campbell and I am General Counsel for ENTRIX, a Houston and San Francisco-based environmental consulting firm. Prior to my tenure with ENTRIX, I was General Counsel for the National Oceanic and Atmospheric Administration (NOAA). In both capacities, I have involved myself in a series of issues that have included both environment and trade. Last year as head of the Commerce Department delegation to the "Earth Summit," I had an experience that had a significant effect on my views on environmental trade. The Rio Summit focused world attention on the environment. More than 150 world leaders gathered and exchanged commitments to dedicate more of their resources to deal with environmental problems. These commitments will be good for the global environment and could be good for U.S. environmental companies.

But Japan announced in some of the press events surrounding the summit that they had identified environmental goods and services as a $200 billion export market. Other figures indicate that this market will grow to $300 million by the year 2000. The Japanese exhibit at the Environmental Trade Fair in Sao Paolo, an event contemporaneous with the Earth Summit, reflected the intensity of Japan's interest. The Japanese government-sponsored exhibit dwarfed the U.S exhibit both in size and substance. It was seven times larger than the U.S. exhibit and was carefully directed at the sale of Japanese environmental goods and services. The German exhibit was only slightly smaller. On the other hand , the U. S. exhibit was not only smaller but it also missed the point. The vast majority of our exhibit consisted of presentations of government agencies that focused on how they regulated U.S. industry, which of course had nothing to do with the promotion of U.S. environmental goods and services. At the Environmental Trade Fair, we had missed both the boat and the point. My fear is that Rio and Sao Paolo are symbolic, and that we will only wake up to this global opportunity when the U.S. competitive advantage in the area has passed.

The world focus on the environment presents an opportunity to increase U.S. exports. For twenty years, U.S. industry has borne the burden of some of the most comprehensive environmental regulations in the world. Now U.S. companies have the opportunity to reap one of the benefits of this burden by taking the technology and "know-how" that they have developed over this period and exporting it. But the window of opportunity presented by our current technological advantage will be short as international competitors gain experience and market share.

The need for the kind of federal environmental trade promotion strategy suggested in your "concept paper" is great. The first step in that strategy should be education, particularly the education of developing nations. Before we can export our technology to the developing world, we must export our environmental ethic. Environmental groups should be a part of such an educational effort. Government agencies like NOAA and EPA should also be used in this effort. EPA can tell of the costs of clean-up of places like Love Canal and NOAA can speak with authority to the destructive effect of pollution on fisheries resources and the marine environment as a whole.. Other agencies could explain the health care costs associated with pollution (e.g. cholera, typhoid etc.). We need to teach the developing nations what we have learned , specifically that the real costs of pollution are great and when fully understood they more than justify the cost of sound environmental technology and services. U.S. environmental agencies and environmental groups should work together to raise the consciousness of the developing world by helping them understand that good environmental planning builds stronger, healthier economies and a better quality of life for their populations. This would be good role for what you have described as the "Volunteer Environmental Services Corp."

The educational effort must also target U.S. companies that have traditionally focused their efforts exclusively on U.S. markets. They must be helped to understand the tremendous opportunities that exist internationally. The Environmental Business and Technology Institute could be used to encourage the efforts of established private trade associations in their promotion of environmental trade. These organizations already have the relationships in the countries that they focus on and we should build on the work that they have done, not duplicate it. These trade groups, with the assistance of the Environmental Business and Technology Institute, must provide these environmental companies with access to foreign businessmen and to government officials who have need for environmental products. Anyone who has sold a product knows that half of the sale is getting in the door.

An example of how this kind of partnership can work occurred in Turkey a little over a year ago. The Commerce Department and the Export Import Bank participated in a pilot initiative in Turkey assisting U.S. companies entering the environmental trade market. The Turkey initiative was accomplished through combining the following factors in a bilateral conference setting:

THE SEVEN FACTORS OF THE TURKEY INITIATIVE:

1 **U.S. Technology and Expertise** (represented by presentations made by major U.S. Corporations working in the environmental area).

2 **Financing for Acquisition of U.S. Technology** (represented by presentations made by Export Import Bank, World Bank, Citibank and the two major Turkish banks).

3. **Presentation of Need for Environmental Technology** (presentations by EPA and NOAA on the real cost of pollution).

4 **Participation of Local Turkish Government** (represented by local municipalities who would be purchasing environmental technology).

5. **Participation of National Government** (represented by the Minister of Environment and the Minister of Finance).

6. **Participation of Local Industry** (represented by the Major Turkish companies).

7. **Facilitated Through Non-Government Trade Organization** (represented by the Turkish American Friendship Council).

The Turkey initiative provided U.S. companies with access...access to buyers, government and corporatations; access to information about the nature of the problems faced by those buyers; access to information about financing and some of the people that make the lending decisions. Furthermore, they had NOAA and EPA there selling the need for environmental action. The initiative in Turkey provides a model as to how the various elements of the federal government can cooperate with trade associations and U.S companies to increase environmental exports. In the fall of this year, the Commerce Department (NOAA and ITA) and the Export Import Bank will sponsor two more of these conferences, one in Mexico and the other in Chile. The Commerce Department is a natural place for these kind of efforts to be coordinated in that it is the only place in government where a trade agency and an environmental agency share the same leadership.

The obvious benefit of efforts outlined in the "option paper" is the benefit to our global environment, which alone is sufficient justification for the promotion of environmental technologies and expertise in developing countries. The other obvious benefit is the direct trade in environmental goods and services. A less obvious benefit is that it serves to balance the playing field for trade and employment outside of the environmental area. The majority of nations have environmental requirements and standards that are either less stringent than or less stringently enforced than ours. This difference creates a competitive advantage for foreign goods. This disparity also creates an incentive for U.S. companies to move their operations overseas causing the export of precious U.S. jobs.

The bottom line is that export of environmental goods and services is good for U.S. companies and U.S. workers, and it is good for the environment. This is the kind of national effort that our government was created to support and sustain. Quite simply to fail to act in this area would be so irresponsible as to constitute a breach of the public trust.

Mr. Chairmen, members of the sub-committee, thank you for the opportunity to speak with you on this most important topic. If you have any questions about my testimony, I would be more than happy to answer them.

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TESTIMONY SUBMITTED TO
SUBCOMMITTEE ON ENVIRONMENT AND NATURAL RESOURCES
COMMITTEE ON MERCHANT MARINE AND FISHERIES
U.S. HOUSE OF REPRESENTATIVES

FEBRUARY 25, 1993

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Thank you, Mr. Chairman, for the opportunity to present testimony on proposals to establish a national program to support exports of U.S. environmental technologies, goods, and services.

I am a Senior Researcher at Worldwatch Institute. In that capacity, I authored a chapter in the Institute's annual State of the World report on the interrelationships between world trade and the environment, and will publish a free-standing study on the subject next month.

As the members of this sub-committee well know, the last few years have seen a flurry of concern over the possible negative effects of expanding trade, and trade agreements themselves, on environmental quality around the world. In my work on this issue, I emphasize that though we must be vigilant about the possible threats posed by trade, we must also be aware and take full advantage of the potential opportunities. One of the primary environmental benefits of freer trade is its potential to help distribute advanced environmental technologies around the world. The proposed national program could help advance this goal.

One of the reasons that international trade is such a focus of environmental concern is simply that it is growing fast. Merchandise trade--including both primary commodities and manufactured products--has increased eleven-fold since 1950 and is now tallied at $3.5 trillion, outpacing the expansion of global output as a whole over this period. Trade in services is also on the rise, as is direct investment in foreign countries.

This rapid expansion poses some threats, such as dumping of toxic waste, destruction of tropical forest, the creation of pollution havens, and--as free trade agreements are concluded--attacks on environmental laws as "nontariff barriers to trade." Yet it also offers welcome opportunities--such as those discovered by villagers in the Dominican Republic who use photovoltaic cells shipped from the United States to light their homes, or by Greenpeace magazine, that, as recently as 1990, imported paper from a Swedish mill because no U.S. facility could supply paper produced with a chlorine-free bleaching system, or by U.S. auto consumers in the 1970s, whose fuel efficiency was greatly improved by the spur of Japanese automaking competition. We need to be explicit about discouraging the environmentally harmful effects of trade and encouraging the benefits.

Global markets disseminate products and technologies that can help speed the adoption of cleaner, more energy and materials-efficient industrial processes throughout the world. As environmental laws are strengthened in developed and developing countries alike, sales of pollution control equipment are surging. Japan, the United States, and Europe (mainly France, Germany, and the United Kingdom) collectively exported $20 billion worth of such equipment in 1990--about 10 percent of the industry's total production.

And the term "environmental industries" properly extends well beyond the narrowly-defined realm of pollution control. For instance, renewable energy industries are increasingly aiming at international markets. In one particularly good year, for instance, wind turbine manufacturers exported over 550 megawatts worth of equipment, equivalent to about one-half the generating capacity of a typical large nuclear power plant, and valued at $720 million. In 1992, $200 million worth of photovoltaic solar cells--more than half of the world's total production--were exported by their manufacturers. Other products that could be disseminated around the world include water-efficient industrial technologies and household appliances, as well as a vast array of energy- and materials-efficient processes.

Besides spreading advanced technologies, international trade puts pressure on companies to match the environmental innovations of their foreign competitors, as in the U.S. motor vehicle industry's response to Japan's advances in fuel efficiency. Other examples include the early success of Swedish industries in developing low-flow toilets, which have now been replicated around the world, and a U.S. lead in some air pollution control technologies that has now been overtaken by the Japanese and the Germans.

Professor Michael Porter of Harvard Business School points out in his book, The Competitive Advantage of Nations, that countries that get ahead of the curve in terms of environmental regulations and technologies will often gain a competitive advantage in international markets, rather than the disadvantage that is sometimes forecast by industries opposing new laws. It is thus critical that the economic and technology strategies of the Clinton Administration include a strong environmental component in order to help U.S. companies fare better in global markets. Fortunately, Vice President Gore has long been a proponent of this view.

One good example of the kind of approach that is needed is Sematech, a government-industry semiconductor consortium, that is often cited as an example of a successful public-private partnership for technology development. Less widely known is the fact that fully 10 percent of the federal contribution to Sematech, $10 million, is earmarked for the development of clean computer-chip production technology.

Though the growth of foreign investment brings with it environmental dangers, such as the possible creation of pollution havens like the "maquiladoras" zone along the U.S.-Mexico border area, it also brings potential gains. For example, General Electric recently entered into a joint venture with the Tungstrum Corporation to produce energy-efficient compact fluorescent light bulbs in Hungary. A World Bank study compared the rates at which 60 different countries were adopting a cleaner process for making pulp for paper, and concluded that the new technology made its way to countries open to foreign investment and trade far more rapidly than to those closed to it. As restrictions on investment are freed under trade agreements, including the North American Free Trade Agreement (NAFTA) and the Uruguay Round of GATT (General Agreement on Tariffs and Trade), it is critical that incentives are created to encourage environmentally-friendly types of investment. For instance, under NAFTA, independent power producers, including those using renewable energy sources and natural gas, will have greater access to the Mexican market.

Trade in services is another growing area of world trade, and one that is for the first time being brought under the umbrella of trade agreements. Here, too, environmental advantages will be gained by opening the way for environmental services such as environmental consulting firms and energy service companies. There are provisions in both the NAFTA and the latest draft of the Uruguay Round of GATT that open markets for environmental services.

A mechanism to support the transfer of environmental technologies would be a useful element in the side agreement on the environment that will supplement the NAFTA. The Mexican government sorely needs technical assistance in environmental technologies. Senator Baucus, for one, has suggested that the proposed North American Environmental Commission include a consulting arm that could serve this function. This is something the Mexicans would welcome, and need, if they are to meet the stepped up environmental obligations that will no doubt be required of them through the side agreement.

Under the U.S.-Mexican environmental plan for the border area, commitments were made by the Mexican and U.S. governments to spend $839 million over four years on sewage treatment and other environmental investments. None of the U.S. contribution has yet been appropriated, however. Meanwhile, estimates of the amount of funding that is really needed to address the severe environmental problems along the border are far higher, in the range of $5-10 billion. As Congress considers the NAFTA, the question of how to raise these funds will come under the political spotlight and hopefully be addressed. This could offer sizable opportunities for U.S. environmental industries.

From the heads of Chambers of Commerce to the heads of environmental groups, it is now commonly heard that environment will be the trade issue of the nineties, and that trade will be one of the preeminent environmental issues of the decade. Though a failure to consider the environmental impacts of trade could have dire consequences, integrating environmental considerations into its fabric would yield sizable environmental returns. Trade must become a vehicle for promoting products and technologies that will help ensure ecological health, not those that undermine the prospects for an environmentally sustainable future.

TESTIMONY OF DWIGHT SANGREY, PRESIDENT OF THE OREGON GRADUATE INSTITUTE OF SCIENCE & TECHNOLOGY BEFORE THE SUBCOMMITTEE ON ENVIRONMENT AND NATURAL RESOURCES OF THE COMMITTEE ON MERCHANT MARINE & FISHERIES CONCERNING ENVIRONMENTAL TECHNOLOGY IN WASHINGTON, D.C. ON FEBRUARY 25, 1993

My name is Dr. Norman R. Eder, Vice President of Public Affairs at the Oregon Graduate Institute of Science & Technology in Portland, Oregon. I am here on behalf of our President, Dr. Dwight Sangrey, who due to scheduling conflicts could not come to Washington to be with you today. I would also like to introduce to you another Oregonian, Gene Davis, who is a member of the Board of Directors of the Oregon Environmental Technology Association, a trade association of over 100 companies.

Over the past three decades the United States has become the world's leader in the development of environmental technology. This leadership is, of course, an expression of our technical competence in a large number of engineering and scientific disciplines and of the education offered by our research universities. However, at the same time we should be fully aware that we owe our position largely to the actions of local, state and federal governments. Driven by public pressure to assure a clean and safe environment, government in the United States has responded to the challenge by creating a regulatory environment that has demanded and pushed technological innovation.

It is one of the ironies of environmental regulation, which has often been criticized, that it now presents the United States with an opportunity to dominate a remarkable worldwide economic market for products, services and information. This exists precisely because the United States has dealt seriously for decades with evaluating and maintaining a high level of environmental quality. As a result, we have achieved unique capabilities in technology and human resources. These capabilities represent a great comparative advantage in expanding the international environmental business. We must capitalize on this advantage and begin to act now to make environmental technologies, the ability to use them, and related services one of our chief export businesses of the 21st century.

The state of Oregon is a good example of how this process has worked to to produce economic gains. As you are aware, Oregon has been a leader since the early 1970s in developing environmental laws. From the first bottle bill and land use laws to the establishment of air and water quality standards that have consistently exceeded national expectations, the people of the state have taken great pride in protecting their natural environment. Although unintended, this emphasis on environmetal quality has produced a strong and vibrant technology base that has produced one of the state's most successful industrial sectors. Members of the Oregon Environmental Technology Association are creating an industrial sector that has already grown to 2.8% of the gross state product. This is higher than either Washington State and California and exceeds the national average which is estimated to be only 2.1%.

Oregon's environmental climate alone is only part of this story of industrial development. Much of the research and testing and training to use new technology has been shouldered by the state's research universties. I am proud to say that my own institution, Oregon Graduate Institute, has played a major role in these arenas and from its founding has been a bridge between environmental demands and industry. Today, OGI is one of the leading providers of environmental knowledge and technology and it is serving both regional and national constituencies.

Public pressure for a clean environment is a worldwide phenomenon. From developed European countries to the developing countries of Africa, the Americas and the Pacific Rim, international and domestic green political movements are driving governments to address the needs of environmental clean-up. Firms with knowledge, technology and the ability to apply technology will find a huge world market for their services and products. Here is just a short list of the kinds of services and products that will be needed:

Solid Waste Management
Toxic Materials Handling/Disposal
Environmental Consulting
Air Pollution Control
Heavy Equipment Manufacturing
Transportation/UrbanPlanning
Education and Training
Hazardous Waste Management
Water Treatment Facilities
Recycling/Resource Recovery
Energy Conservation Equipment
Environmental Law
Coastal/Ocean Management
Analytical Services

It has been estimated by the Environmental Business Council that the world market for these and many other services is currently $370 billion and growing at a rate of 15% each year. Although the United States is clearly the world leader at the moment, our competitors in Asia and Europe have recognized the market potential for environmental technology and information. I commend this committee for taking on the challenge of maintaining US leadership in this arena.

Our capacity to compete in the growing environmental technology marketplace will be determined by our ability to continue to develop a broad spectrum of new and appropriate technologies and the people who know how to use them creatively and to bring them to the global market. An underlying key to this will be our ability to create a well-trained work force and establish test beds to develop and refine the latest in technological innovation.

I believe the two are closely related and that the establishment of a union between businesses, government and universities can be used as a successful model for maintaining and expanding U.S. environmental technology leadership.

I urge the Committee to consider the establishment of regional environmental technology research and development centers similar to those proposed in HR 5895. I would emphasize two key points. First, it is vital that there be more than one center and they have roots in regional diversity and needs. There should be at least five centers, New England and the Mid-Atlantic, Great Lakes and Midwestern, Southern and Gulf Coast, South Western and Pacific Northwest. At the same time, these proposed centers should be connected through a common information and data system and be capable of cross center referral and cooperation. Similary, although they may be managed by independent entitites, they should be asked to develop strong ties to national laboratories and the universities community.

I am encouraged to hear that during this session the subcommittee may propose that the centers be placed under the direction of an Under Secretary of Commerce for Environmental Technology Business. The proposed centers can meet a variety of critical needs. They will build a foundation for interaction between university and corporate applied research and product development. Upon this, the centers should provide a wide array of research, development, training and marketing services to large and small businesses seeking to participate in the coming global environmental technology marketplace. In addition, foreign firms should be asked to come to the US to participate as well. And in the end, US environmental technology and services, from hardare to software, from training and education to on-site remediation, will be purchased and used by offshore firms and governments when they return home to address their own environmental problems.

Let me be clear, though. I am not advocating another set of university research centers: serving primarily academic needs. The vision is bigger. Instead these centers should emphaize hands on activity: from applied real world research to field training and education. All are commodities with significant economic value around the world now and far into the future.

At their most basic, the centers and their staffs will provide information about available technologies and techniques. They will serve as an integral link between the market and the research community. In this capacity the centers and their staffs will promote and identify business opportunities and serve as a focal point and clearinghouse for federal, state and local environmental technology resources.

This brokering role, however, will only be the front door of the proposed centers. I also see them as home to joint technology development and testing programs This mission, joined to a certification capability, is very important. Because of the pressing nature of problems and the enormous expense in dealing with them, international success in the environmontal marketplace will depend upon the ability to deploy technology that is both appropriate to need and circumstance and that works as advertised. This means that the centers will need adequate funding to conduct ongoing research and to evaluate new technologies and techniques for prevention, measurement and remediation of environmental hazards. In taking on this mission, the centers will become essential players in equipping U.S. firms to compete abroad by adding real value to their efforts.

Equally as important to research and testing will be the centers' ability to perform training and education. In this capacity, centers can combine the talents of university and industry scientists to offer specialized training programs to workers and entrepreneurs. At the same time, training and education will become a critical tool in overseas marketing. On-site education seminars of all kinds can be used to show off the talents and technological capabilities of American firms to visiting foreign corporate and government officials.

Why am I so confident that this model can and will work? Five years ago Oregon's Science Council identified environmental technology and services as a key growth industry of the future. In the end the state failed to fully act upon this recommendation but OGI took up the challenge on its own and if our small success to date is an indication, we have only scratched the surface of what is possible.

Universities across the United States are producing high quality environmental research, and some are exploring technologies with commercial applications. However, we at Oregon Graduate Institute of Science & Technology set out to become a regional generator of applied science, engineering and technology because we recognized the booming opportunities for ourselves in the environmental marketplace. I would like to give you some examples from our own experience that now serve as the basis for our own growing global environmental interests.

We are currently using a large-scale outdoor test facility on our campus to conduct research and to develop methodologies designed to improve our ability to remediate underground chemical spills. Funded by a consortium of US and international industries and the EPA, we have accumulated new knowledge about how toxic materials behave in the underground environment and developed new ways to use high tech instruments to characterize problems.

Over the past three years we have established a network of field sites throughout Northwest Oregon. Combined, these sites represent some of the most pressing environmental problems faced by every urban and rural area nationally: urban effluents, agricultural run off, soil contamination, degraded wetlands, animal habitats and site restoration. As part of this program we are working with local and state agencies and several private companies to develop site specific remediation strategies and to test new advanced analytical techniques. At one site, Portland's closed urban landfill, our faculty are working with the regional government to create new models of long-term monitoring and management. Other faculty are developing new computer modeling tools for better management of the Columbia River for both preservation of endangered species and improved resource allocation for irrigation and power generation.

Our Materials Science and Engineering Departments are currently working with 15 primary producers of metals and metal-based products, aluminium to titainium, to design highly energy efficient, conservation-minded manufacturing technologies to reduce waste and preserve natural resources. In doing this we have achieved important improvements in product quality and at the same time met environmental goals. In the same department we have faculty who have developed, with Navy support, a unique welding system that improves productivity, cuts costs and dramatically increases the quality of ship construction and repair. Recently, we began to develop a spin-off technology for use in the construction of double-hull tankers to address a need graphically illustrated every time an oil tanker goes astray.

Finally, we have had some initial success in reaching an overseas education and training market. OGI has developed an arrangement with a foreign utility to provide their employees with technical training in environmental testing and management. Over the next year we intend to work towards similar agreements with other foreign companies. The result will be not only income from the sale of educational services but even greater opportunities for other services funded by offshore companies. This certainly meets my test of an export industry.

In each of these examples, and others I could cite, OGI is developing technology and products that are in great demand not only in our own country but overseas. We have done so with the involvement of regulators and business interests as well as federal funding sources. We have done much on our own and we certainly expect to do more in the future. However, when combined, these and other applied research and development activities going on elsewhere in the Pacific Northwest, provide an insight into what a regional environmental technology center could accomplish.

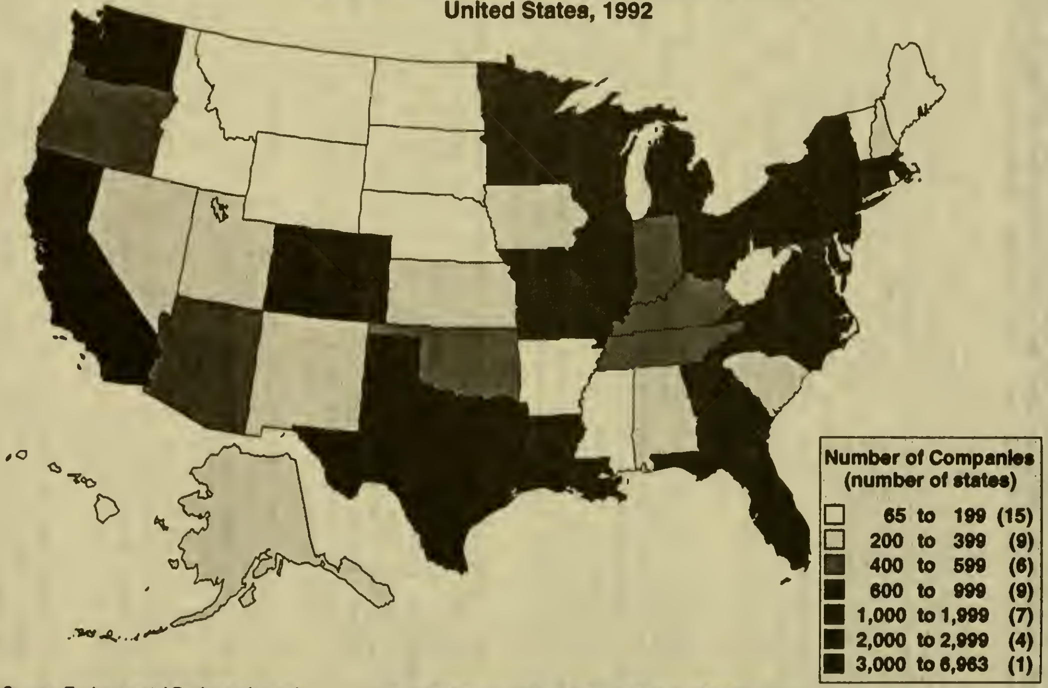
I have advocated, in the brief time before you today, a bold course of action. All too often we have allowed markets to get away from us when we held an early technological lead. We have an opportunity today to capture a major new export market; one with the potential to be the largest growth industry in the next century. At the same time, it is a market that will be wide open to big and small firms; from the huge international construction firms to the one-person consulting shop. The dividing line between success and failure will be possessing technology and the ability to apply it in the field and on a global scale.

Too often in the recent past the United States has allowed itself to drift unthinking on the international economic stage. I have always thought that when faced by a challenge people and governments should think for a moment and then do things on purpose. We must act with a clear goals and ambitions. Environmental technology and the role it will play in the global marketplace presents us with an opportunity to set meaningful goals that can be fulfilled by doing something on purpose.

APPENDIX C

Environmental Business Council of the United States, Inc.
Boston, Massachusetts

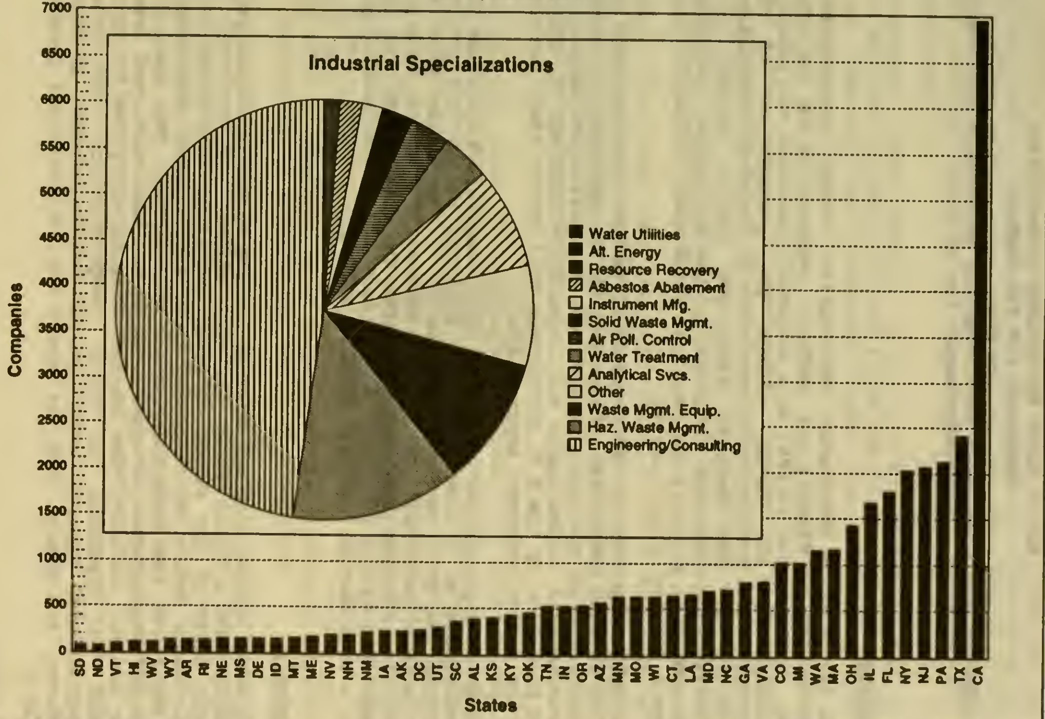
Distribution of Environmental Companies in the United States, 1992



Source: Environmental Business Journal *Map prepared by HDM: Harvard Design & Mapping Co., Inc.*

Number of Environmental Companies per State, 1992

Environmental Business Council of the United States, Inc.
Boston, Massachusetts



Source: Environmental Business Journal

Prepared by HDM: Harvard Design & Mapping Co., Inc.

Air & Waste Management Association
Statement for the Record
on the
Proposal for a National Environmental Technology and Business Competitiveness Act of 1993

Overview

The Air & Waste Management Association (A&WMA) appreciates this opportunity to discuss our members' perspective on the proposed Act. Incorporated in 1907 as a nonprofit technical and educational association, the A&WMA offers the perspective of 14,000 environmental professionals from over 50 countries worldwide, the majority of the members from the United States. These professionals represent all phases of the profession, including the environmental products and services which stand to benefit the most from a growing global market.

The A&WMA supports the development of an open international market of envirotech industries as the only way to aggressively pursue the elimination of pollution in the most cost-effective manner. U.S. environmental technologies are competitive with any in the world, and promotion by the U.S. government will hasten their penetration of the market whenever appropriate.

The A&WMA applauds the efforts of this committee to provide for the development of a comprehensive, national policy and program to promote the U.S. envirotech industry. It is needed both from a trade development perspective and, as mentioned above, to eliminate pollution through technology transfer and development. Of special importance is the Committee's consideration of how best to provide for a coordinated approach to this effort.

Comments

The A&WMA agrees that any country wishing to promote their products should have a focal point for that effort. If the U.S. effort falls short of the effort of other countries, the A&WMA suggests that it is less a result of any lack of government effort and more a result of the fragmentation of that effort. The mission of a cleaner environment and open trade is too important, and resources too scarce, to allow the current fragmented system to continue. Among the agencies in which responsibility for promoting environmental exports reside include the Departments of Commerce, Defense, and Energy, and the Agency for International Development (AID.)

There appears to be little coordination among these programs and the apparent duplication of efforts is especially disheartening given the other urgent core responsibilities of some of these agencies. Even the U.S. EPA, with its backlog of regulatory issues, has begun devoting resources to the promotion of environmental technology exports.

Our core message to the committee is that the fragmentation must be addressed and that professional and trade associations such as the A&WMA are underutilized resources under current policy and structure.

Thus, the A&WMA regards the creation of a new office within Commerce at the Under Secretary level as an unnecessary duplication of existing offices. It's creation would be one of a number of new programs which would further fragment federal efforts without apparent compensating benefits.

For example, The A&WMA has seen the creation of a new program recently, the U.S.- Asian Environmental Partnership (US-AEP), which has not made use of existing mechanisms. The result is that US-AEP has built a formidable arm of bureaucracy without delivering a single significant opportunity.

The A&WMA believes that the Department of Commerce's International Trade Administration can provide the necessary support for environmental exports given sufficient emphasis and finances for increased staff, and the role of coordinating the efforts of other **effective** agencies, notably Commerce's Foreign Commercial Service and the U.S. Trade and Development Agency. It may be that ITA's place within Commerce needs to be elevated and that it be given the central role to coordinate across agency jurisdiction. Even if it is decided that a new department should be created, it should only be accomplished in the context of eliminating or rationalizing the current duplication of efforts and waste of resources.

Another result of this fragmentation has been an insufficient recognition and utilization of existing environmental trade and professional associations such as A&WMA which are successfully working towards many of the same goals as stated in the proposed Act. The A&WMA and other environmental organizations currently provide the services listed under the proposed private, nonprofit International Environmental Business and Technology Institute through the efforts and financial support of their members and through grants from U.S. agencies. The creation, with federal--

funds, of a new institute fails to utilize existing expertise and imposes an undue burden of government-supported competition to programs which have long served the environmental industry.

The A&WMA, for example, has long been recognized for the quality of its technology transfer programs, including technical conferences, workshops, training courses and, recently, satellite seminars developed to bring training to more people at a lower per person cost.

The A&WMA is especially sensitive to this issue as a result of a recent action by the U.S. Environmental Protection Agency. EPA created and is promoting a new private, nonprofit environmental training organization. Government-supported creation of a new organization was not necessary. Even the independent report upon which the new nonprofit was justified clearly identified that organizations exist with proven expertise in environmental training, and recommended that these organizations be used to provided training to foreign nationals. The A&WMA and other associations now finds themselves in direct competition with the weight of a government agency which is actively promoting its own creation. The A&WMA believes that creating a new organization (the International Environmental Business and Technology Institute) rather than accessing the existing ones should not be repeated.

For a fraction of the $5 - 10 million dollars per year proposed in the Act, the A&WMA and other environmental organizations could provide **the highest quality** programs through their membership, representing all range of environmental businesses, educational institutions, and professionals. The A&WMA believes this approach, utilizing existing private, nonprofit environmental organizations offers the greatest benefit to the U.S. taxpayer **and** the U.S. environmental industry.

Recommendations

As the National Environmental Technology and Business Competitiveness Act of 1993 moves to another round of drafts, the A&WMA proposes that:

- the focal point for the U.S. initiatives reside in an existing office, and that office be provided with the authority and support necessary to accomplish its mission.

- the other existing federal mechanisms be available to the lead office to assist in the accomplishment of its mission, e.g., use the Foreign Commercial Service rather than create new American Business Centers.

- existing environmental professional and trade organizations such as the A&WMA be provided with the support necessary to work with the government lead agency to perform the studies necessary to identify the environmental needs of target countries, sponsor training and education programs for foreign nationals, and develop linkages among the environmental organizations, Chambers of Commerce, state development agencies, World Trade Centers, Department of Commerce regional offices, and international agencies such as the World Bank, which can more effectively reach the environmental industry.

- as part of the policy review, a study should be done recommending how best to rationalize and /or coordinate existing programs including quantifying the expenditure which could be saved.

Finally, the A&WMA offers the expertise of its members to the subcommittee as a resource to provide insight from the environmental profession during the course of drafting this important piece of legislation. Attached is additional background information about the A&WMA and its programs.

TESTIMONY OF
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FOR THE
U.S. HOUSE COMMITTEE ON MERCHANT MARINE AND FISHERIES
SUBCOMMITTEE ON ENVIRONMENT AND NATURAL RESOURCES

ON
BUSINESS OPPORTUNITIES
IN ENVIRONMENTAL TECHNOLOGY AND TRADE

FEBRUARY 25, 1993

Thank you, Congressman Studds, for your invitation to testify on your proposed legislation regarding promotion of exports by U.S. environmental businesses. I commend your leadership in this important field.

Americans need more jobs, the economy needs revitalization, and the environment needs healing. A way to address all three problems successfully is through the environmental industry.

The environmental sector could create millions of new jobs in the next decade. Future jobs include environmental auditors, green designers of products and processes, and environmental plant managers.

Moreover, the environmental sector could be key in shifting the U.S. from a military to a civilian economy. Many environmental jobs overlap well with the skills of people dependent on defense for jobs. Additionally, defense has been a major priority which absorbed a huge amount of money and people: environmental clean up is needed on the scale that could use those resources productively.

Others here will speak about the enormous size of the world environmental markets, and the rapid growth expected this decade. The environmental industry, while still relatively new, is already worth over $200 billion a year, and is quickly becoming one of the largest industries in the world.

The current size of the environmental industry is impressive, and the possibilities for growth worldwide are fantastic. However, we should be careful in assessing industry strength, present and projected. We should not confuse possibilities with certainties.

While some sectors of the environmental industry have done well in the past several years, many have not. As you can see from the industry overview by the Environmental Business Journal (e.g. April, 1992), the past several years have been difficult for most environmental companies. This analysis is corroborated by the end of the year stock review by the New York Times in December, 1992 which indicated that most environmental stocks went down.

Some of this decline is due to temporary conditions such as the general recession, lax enforcement of environmental regulations, and lack of capital.

A more disturbing factor that holds back US environmental business is the fact that other places, particularly European countries and Japan, more aggressively develop environmental technology and seek international markets. Although the United States in many ways created the environmental business field, we are losing ground in world markets.

Additionally, U.S. companies are beginning to lose part of our own domestic market to foreign competitors. For example, the U.S. imports fully 26% of our air pollution control equipment, largely from Japanese and East Asian firms, reported the Organization of Economic Co-operation and Development in 1992. That same report shows that European firms are making inroads to the U.S. market in waste treatment and collection systems.

There is another concern that all of us who want to promote environmental businesses must address - economic globalization. As I have indicated, the globalization of the economy offers promise. The need for environmental services and goods to bring the former East Germany up to the environmental standard of West Germany, for example, would cost billions of dollars in the next decade, creating markets for environmental business.

However, globalization can have a dramatically different effect. Rather than raising environmental standards, it could lower them. Instead of raising Berlin to the level of Bonn, one possibility of globalization could be to reduce both to the ecological level of Bombay or Mexico City. This is a possibility of the North American Free Trade Agreement (NAFTA) and the ongoing negotiations around the General Agreement on Trade and Tariffs (GATT).

Although the need would remain as high for environmental restoration and pollution prevention, GATT could undermine local and national environmental regulations which have proven to be the main stimulus to environmental business. GATT could take the wind out of the sails of the world environmental markets just as they are about to take off.

President Clinton is surely right when he says that we must compete in, not retreat from, the world economy. But environmental business advocates must join with trade unionists, environmentalists and human rights champions in insisting that the globalization of the economy will proceed by raising living standards, including the quality of water and air, not by lowering them.

If we are to help environmental business grow, we must pay attention to several factors including:

- the regulatory climate for environmental protection (and remember that this sector thrives on strong regulation);
- the overall health of the economy;
- the industrial strategies to promote environmental business adopted by our major competitors;
- conversion of military spending, human capital and technology to environmental uses; and
- the ongoing debate on trade and the globalization of the economy.

International markets could spur enormous growth for U.S. environmental businesses if there is an intelligent and coordinated approach to the growing world demand for environmental goods and services. I will suggest two approaches to fashioning that intelligent and coordinated approach.

1) FORM AN "ADHOCRACY" TO COORDINATE FEDERAL ACTIVITY ON ENVIRONMENTAL BUSINESS.

The success of our competitors is in part due to their more developed cooperation between business and government. MITI in Japan, for example, has established a new research and development center called the Research Institute of Innovative Technology for the Earth (RITE) to coordinate research on environmentally related industrial and energy technologies. England has launched the Environmental Technology Innovation Scheme (ETIS) to promote environmental technology through encouraging innovation, improving environmental standards, and helping their industry be more competitive. Three years ago, Canada launched an Environmental Industries Sector Initiative to develop a strategy for environmental business.

Without more focused and coordinated action by the U.S. federal government, we will experience a declining share of the world markets in a field that we largely created. With that action, we could strengthen our leadership in this field, create millions of jobs, and generate billions in profits.

We need a vehicle to coordinate federal agencies, so that environmental companies can find less red tape and more red carpets.

"Adhocracy" is a term used by Robert H. Waterman, coauthor of In Search of Excellence, to describe an innovative approach that has proven successful in many companies. "Adhocracy" is an organizational form that challenges the bureaucracy to embrace the new. Waterman believes "adhocracy" is important enough that he wrote his latest book on it, Adhocracy: The Power to Change (NY: W.W. Norton & Co., Inc, 1992).

The federal government could form an "adhocracy" to create jobs and stimulate the economy by promoting exports for environmental business.

Perhaps the newly created Office of Environmental Policy in the White House could take the lead in convening this inter-agency working group. Being in the White House, and having no significant turf, the Office of Environmental Policy is in a wonderful position to bring the different players together. Perhaps the Office of Environmental Policy could meet the needs of the working group proposed in the 1992 Export Enhancement Act.

In any case, the Office of Environmental Policy could be a catalyst for the communication and cooperation needed among federal agencies regarding environmental exports.

2) THE INSTITUTE

Outside of government but in partnership with it should be an institute which can work with business, environmental advocates, community groups, labor, and educational organizations.

I have attached a more developed proposal on such an institute. Just a few points here:

* The institute should be independent from business, if it is to have integrity.

* While analysis of current and projected world markets could be done from one center, it would be advisable to have regional hubs around the country. These small hubs could identify local resources including businesses and educational institutions.

* The major activities of the institute could include:
1) assist in the design and implementation of strategies to restore the environment and prevent pollution;
2) analyze current and projected world environmental markets, and help connect environmental companies with those who need what they offer;
3) assist in training people for environmental jobs, including people dislocated from defense; and
4) sponsor exchange programs for business, government, schools and nonprofits interested in restoring the environment and preventing pollution.

Thank you for the opportunity to testify, Mr. Chairman.

The International Environmental Technology Institute: Creating Jobs, Making Money, and Healing the Planet

December 30, 1992

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THE INTERNATIONAL ENVIRONMENTAL TECHNOLOGY INSTITUTE

Eleanor Mulloney LeCain

12/30/92

THE OPPORTUNITY Americans need more jobs, the economy needs revitalization, and the environment needs healing. A way to address all three problems successfully is through the environmental industry. One of the greatest possibilities for job creation and business opportunities in the United States in the 1990's is in companies which restore the environment and prevent pollution. Already the U.S. domestic environmental market is over $100 billion a year and growing, despite the recession. Every country around the world grapples with how to balance environmental protection and economic development. The international market is estimated to exceed $250 billion a year, with prospects for rapid growth.

Growth in the environmental sector provides the US with an opportunity to meet our domestic policy priorities. It could create millions of new jobs in the next decade, including environmental auditors, green designers of products and processes, environmental plant managers, and builders of advanced transportation systems.

Moreover, the environmental sector could be key in shifting the US from a military to a civilian economy. Defense has employed hundreds of thousands of highly skilled workers whose analytic and manual talents are directly relevant for the problem-solving and production necessary to ensure an internationally competitive envirotech industry. Additionally, defense has been a major priority which absorbed a huge amount of resources and people: environmental clean up and pollution prevention are needed on a scale that could use those resources productively.

Currently, American companies have the lead in many areas of environmental technology and know-how. However, other countries such as Germany and Japan surpass us in public-private cooperation in both developing technology and capturing markets. Consequently, other countries are overtaking U.S. companies in fields, some of which were created here.

What is needed is a way for U.S. government and companies to cooperate in the promising field of environmental business.

THE PROPOSAL The International Environmental Technology Institute should be established with the mission of assisting government, business, and other public and private organizations worldwide to achieve sustainable development through the transfer of environmental policy, technology, and implementation strategies. The institute will assist in identifying and fulfilling international needs for environmental goods and services. The particular focus will be on environmental restoration and pollution prevention.

In fulfilling this mission, the International Environmental Technology Institute will expand opportunities for U.S. environmental businesses in domestic and international markets. Most environmental companies are too small to determine where the international markets are for their goods and services, and how to reach them. The institute could help companies identify and connect with likely markets.

The International Environmental Technology Institute should be based in New England which has the greatest cluster of environmental businesses and organizations in the world. Similar institutes could be established in every region of the country, each identifying the relevant resources in its area and all linked in an envirotech network.

ACTIVITIES The International Environmental Technology Institute will have four main activities:
1) assist in the design and implementation of strategies to restore the environment and prevent pollution,
2) help connect environmental companies with domestic and international markets,
3) assist in training people for environmental jobs, and
4) sponsor exchange programs for business, government, schools, and nonprofits interested in restoring the environment and preventing pollution.
Following is a description of each of these activities.

1) The primary activity of the International Environmental Technology Institute will be to assist in the design and implementation of strategies to restore the environment and prevent pollution.

The institute will transmit information and expertise through seminars and workshops. The focus will be the sharing of concrete, practical experience of what works in different areas. Discussions will draw on a range of experienced people in government, business, academia and non-profit organizations. The balance between technology and policy will be explored: in some instances, new technology can improve results; other times, different policies can better achieve desired results, e.g. total cost accounting. Seminars will provide specific environmental policy and technology options for pollution remediation and prevention.

Key participants will be decision makers such as Economic Development Ministers, Environment Ministers, mayors, Chief Executive Officers, and organizational directors. Participants will leave with a deeper understanding of effective ways to restore their environment and prevent pollution, and knowledge of resources available which enable them to do it.

2) The International Envirotech Institute will help connect environmental companies with domestic and international markets. As the world need for environmental goods and services grows, it is difficult for individual companies to know where their goods and services are needed, just as it is difficult for countries to know which companies can help them meet their environmental goals. The International Environmental Technology Institute could bring together countries and companies which can help each other achieve their objectives.

This challenge will be met in a variety of ways.

* Survey world markets for environmental goods and services. Identify sectors which need environmental technology, services, education, and training.

* Gather and analyze environmental laws and programs which could stimulate demand for environmental goods and services.

* Keep abreast of the latest state and national legislation that affects environmental business, e.g. the Eastern European aid bill which targets environmental business.

* Recommend legislation that provides incentives for the development of the US environmental technology industry.

* Work with government officials to promote the export of US environmental technology and services.

* Encourage the US government and international agencies to assist countries with the financing involved in purchasing US environmental goods and services.

The International Environmental Technology Institute will conduct a survey of the extensive envirotech organizations and resources in the Northeast region. Information from the database will be made available through periodic directories and updates.

3) **The International Environmental Technology Institute will assist in training people for environmental jobs.** With the breadth and depth of information about the environmental industry worldwide, the institute will be in a good position to identify industry trends and assess where the jobs of the future will be. The institute can help shape worker training programs, and serve as link between educators, training providers and employers. Particular programs will be set up for retraining defense workers, in research, management, and manufacturing.

4) **The International Environmental Technology Institute will sponsor exchange programs for business, government, schools, and nonprofits interested in restoring the environment and preventing pollution.** Businesses, governments, schools, and nonprofits all have something to offer in restoring the environment and preventing pollution. The Envirotech Institute will foster links within each area, such as business-to-business exchanges, as well as links across areas, such as between educators, business and government.

RESOURCES FOR START UP It will require one million dollars to get the International Environmental Technology Institute up and running. Funds will come from public and private sources. An Executive Director will be hired who will be responsible for opening the institute, preparing a business plan for operations, building support among envirotech organizations, and pursuing financial support from government, businesses and foundations. Other staff will be hired to analyze the structure of the environmental industry, to research current global markets, to project market trends, to conduct seminars and workshops, to identify and coordinate training sessions for workers, and to establish a world-class communications network.

THE FEDERAL GOVERNMENT Environmental business offers major opportunities for job growth, for export markets and for an orderly transition from a military to a civilian economy. The federal government must play a role in promoting the environmental sector or see the job growth occur in other nations.

Congressman Studds has submitted federal legislation that would create a national center for research on global environmental markets. The legislation allocates 50 million dollars for the center and regional offices.

The International Environmental Technology Institute could be the first regional institute in Congressman Studds' proposal. Experience gained in its operations would provide invaluable information on how such institutes could best be shaped.

OPIC
Overseas
Private
Investment
Corporation

Statement for the Record of

James D. Berg
Acting President and Chief Executive Officer
Overseas Private Investment Corporation (OPIC)

to the
Subcommittee on Environment and Natural Resources
Committee on Merchant Marine and Fisheries
U.S. House of Representatives

February 25, 1993

Mr. Chairman and Members of the Subcommittee, it is a pleasure to respond to your invitation to submit, for the record, OPIC's views on the objectives of the outline for a National Environmental Technology and Business Competitiveness Act of 1993.

While the organizational components of the outline are outside the scope of OPIC's activities, OPIC is committed to promoting economically and environmentally sound U.S. private investment in developing countries and emerging countries in transition to market economies. This mandate was renewed as part of the Jobs Through Exports Act of 1992, which reauthorized the Corporation's programs through FY 1994. OPIC's programs include project finance in the form of loans and loan guaranties, insurance against political risks and a number of pre-investment services, including investment missions, reverse missions, and partial funding for feasibility studies.

Since it was enacted in 1985 OPIC has implemented legislation that ensures that all projects it assists are subject to environmental impact assessments and meet acceptable international standards with respect to the environment, public health and safety. In addition, OPIC notifies host governments of environmentally "sensitive" projects that it proposes to assist and transmits technical and regulatory information to assist foreign governments in managing environmental impacts.

By insisting on these high environmental standards for projects that it assists, OPIC contributes to the promotion and diffusion of U.S. environmental technology. When U.S. companies purchase technologies to prevent, mitigate or remediate environmental hazards overseas, they tend to use the same goods and services with which they are familiar in their domestic operations. These projects also have a demonstration effect on local companies that are increasingly being required to manage the environmental impacts of their operations. Thus, OPIC's support of environmentally sound U.S. investments overseas helps to expand local markets for U.S. goods and services.

An example of one such OPIC-assisted environmental project is the investment by McKenzie Methane Corporation in a joint venture to extract coal bed methane from underground coal deposits in Poland for the generation of power and electricity. The positive environmental benefits of this project are three-fold. They include the reduction of fugitive hazard to coal miners; the substitution of clean burning gas for coal and the combustion of a greenhouse gas that would otherwise be vented into the atmosphere. To bring this technology to Poland, McKenzie will purchase $25 million of advanced U.S. drilling equipment, designed to extract the methane and reinject produced waters in accord with the most rigorous U.S. environmental regulations. These exports will support more than 50 U.S. jobs (276 person-years of employment) during the first five years of project operation.

Recognizing the synergism between the environmental implications of its programs and other U.S. government efforts to promote the export of U.S. environmental technology, OPIC has participated actively in interagency programs designed to coordinate and enhance such efforts. OPIC has participated as a charter member of the Committee on Renewable Energy Commerce and Trade (CORECT), particularly its Finance Task Force and Market Development Subcommittees. Through an interagency agreement with the Department of Energy, OPIC has managed several feasibility and pre-feasibility studies for innovative renewable energy financing mechanisms as well as specific renewable energy investment projects.

OPIC has also participated, through the Trade Promotion Coordinating Committee's (TPCC) Working Group on Energy, Environment and Infrastructure, in interagency efforts to promote U.S. environmental exports to particular markets, including Eastern Europe, where we participated in a Commerce Department Trade Mission in 1991. We note that the TPCC's environmental efforts are now mandated by the Export Enhancement Act of 1992.

More recently, we have joined the TPCC effort to promote the use of U.S. clean coal technology in developing countries. We are an active participant in the U.S.-Asian Environmental Partnership (U.S.-AEP) under whose auspices we participated in an environmental trade mission to Malaysia and Indonesia, organized by the U.S.-ASEAN Business Council in 1992. We are currently working with the U.S.-AEP to develop additional strategies to promote U.S. environmental business activities in the Asia-Pacific region.

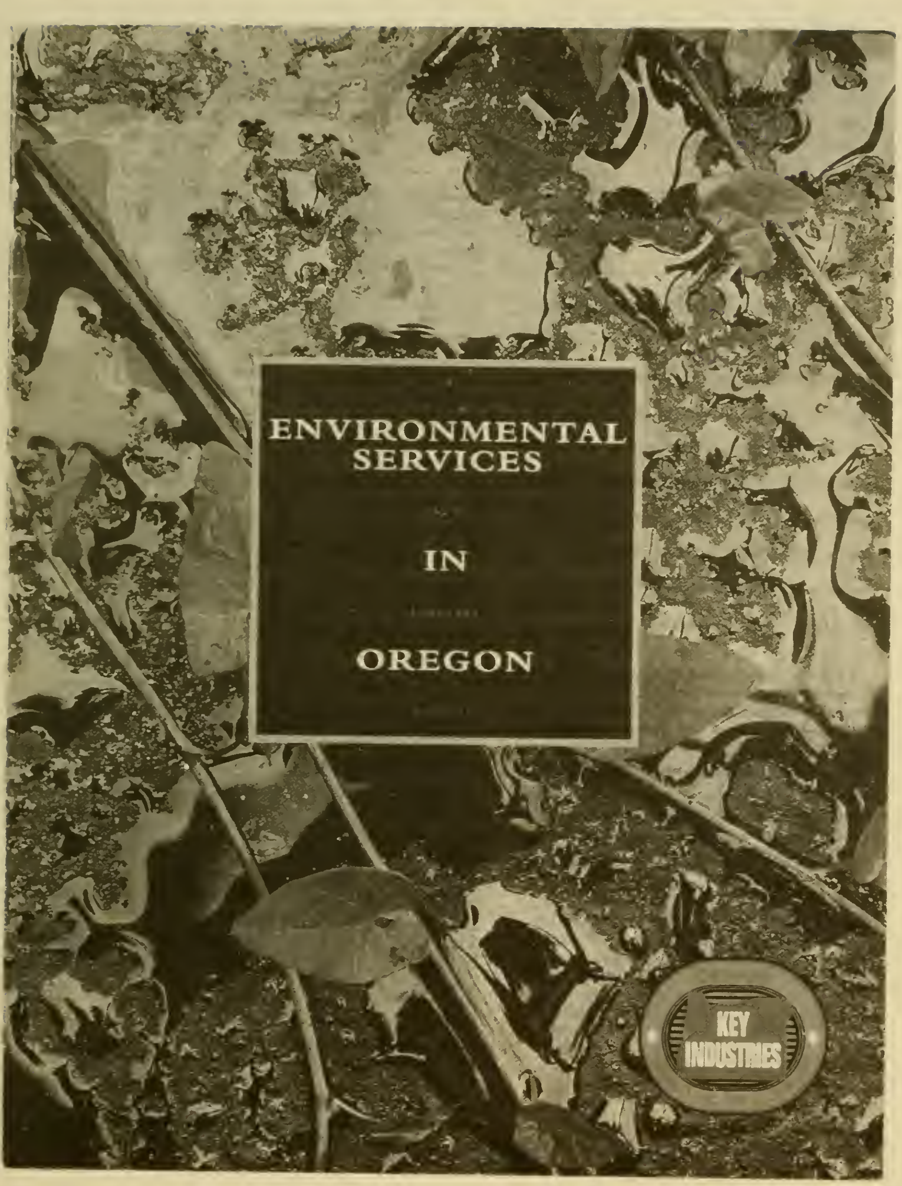
Thus far, interagency efforts to market U.S. environmental technology to specific overseas markets have focused largely on Asia and Eastern Europe, both of which promise rapid growth in the years ahead. In addition to these efforts, OPIC'S recent experience supporting substantial private investment in Latin America leads us to believe that this market may be equally important for environmental technologies and may offer U.S. firms competitive advantages over other regions where foreign assistance and other subsidies play a larger role in the transfer of such technologies.

In addition to furthering its statutory mandates and interagency opportunities in the environmental area, OPIC has taken several initiatives to foster U.S. business innovation in this rapidly growing sector. One is our Environmental Investment Fund that is currently under development and will provide equity and other financing to environmental projects in all OPIC-eligible countries. The Fund is modeled on regional multi-sectoral equity funds that OPIC has successfully sponsored in Africa and the Asia-Pacific regions.

Another OPIC innovation recognizing the contributions that U.S. companies can make to environmental management is OPIC's annual "Ecotourism Award," which we initiated in 1991. This award recognizes entrepreneurs who have been pioneers in the emerging industry of conservation-oriented tourism.

In addition to the efforts of U.S. government agencies to improve outreach, programs and coordination on behalf of U.S. envirotech exports, a crucial factor has always been private industry itself. This has certainly been the case for the renewable energy industry, which has greatly expanded its exports, in large part, through the leadership of its industry associations, particularly the Export Council for Renewable Energy. In this connection, it is encouraging that the environmental industry recently organized the Environmental Technology Export Council to represent America's leading environmental technology firms and trade associations in the growing world pollution control market.

Thank you for your consideration.



ENVIRONMENTAL SERVICES

IN

OREGON

KEY INDUSTRIES

OREGON'S ENVIRONMENTAL SERVICES CHALLENGE

The challenges posed by environmental regulation at times have seemed traumatic to businesses and municipalities during the last 20 years. Less noted in the political turmoil surrounding the controversies of environmentalism has been the development of a new industry. The environmental technology and services industry, dedicated to unraveling the mysteries of doing the right things in an environmental sense, today faces challenges of its own. Among those challenges are defining the costs of meeting environmental requirements as sensible economic investments and finding qualified workers. In a recent round table discussion in Eugene, industry leaders and Oregon Business publisher David Rowe explored these challenges.

Rowe: First, the big picture; what is the environmental services industry?

Gillaspie: It's people and businesses who solve or help solve environmental problems for governments and industries – consultants, vendors, attorneys, laboratories, health and safety people, ecological services people, a wide variety.

Dempsey: I look at environmental services as an outgrowth of what used to be called Public Health engineering. Clearly, it's an outgrowth of public health concerns and it's much broader than most people perceive it to be.

Cover Photography:
[illegible]

Rowe: Is there something about doing business here in Oregon that unifies the industry or makes it different from the industry in other parts of the country?

Dempsey: There's no question we've taken a leadership role in some aspects of water clean-up in Oregon. But it's going to be a matter of us actually moving forward and doing something with the history we've got and focusing that into a marketing position. I don't think we're there yet.

Rowe: When will economics start to drive this industry rather than regulation?

Skoda: Well, I think we're really bringing a major cultural change into our society. Let's take, for instance, a very common sort of situation, an industrial painter who's got a whole series of pollution problems resulting from the volatile substances he uses in his business. Today, he can clean by sandblasting, use ceramic paints and weld them on with lasers, with no volatile substances involved at all. It's less expensive to him but more valuable to his customers, so he can charge more for it. The question is, is this done in the name of the environment or in the name of good business?

Lumapas: Regulations are very useful, but I think we have to look also at the opinions of business, because if we regulate so that business profits are going down the drain, we will lose everything. There needs to be balance to make this industry worthwhile.

Dunder: Regulations can be a positive economic incentive for business. I think it really comes back to analyzing what the real cost is of making a certain product, not just from an economic base, also what it's going to do in terms of the overall environmental impact.

Hatch: I think we also have to remember that people, not businesses alone, have an effect on what we're doing in terms of what we're cleaning up. We

can put as many regulations on as we want on industry and we're still going to have an air quality problem because we have people driving cars all the time.

Rowe: Who is the customer for environmental services, and what is the industry doing to position itself as a proactive solution to environmental problems?

Skoda: The customer is both the public and private sectors. The public sector is a large market place, although its ability to move is related to tax revenues. In the private sector, it's anybody who's in the production stream – agriculture, timber, manufacturing industries. People who are in the manufacturing chain are our primary customers.

Lumapas: Many of our clients are individuals, some driven by the request of banks, some by the request of other agencies. We get them because other entities ask them to do something. On the industrial side, firms like CH2M Hill and Century West and the other consulting firms are our customers because we act as their support group.

Hatch: Consulting services such as we perform are marketed based on long-term client relationships. You help a clients with a little problem, you talk to them again, you help them evolve a planning strategy for dealing with upcoming regulations. It's marketing solutions, but it's also educating the customer on cost effective ways to deal with things. Relationship building is the way consulting is marketed, not going in and saying we can do this better than anybody else.

Gillaspie: I think we'll see increased specialization within the market, people who do particular things better than anybody else. I think we in this room can solve problems that face Oregon government and Oregon industries better than other people because we live here, we know these people, we have relationships with them, we understand their businesses, we know who the vendors are, and we know how to solve their problems.

Rowe: What are the educational needs of this industry, of your companies in particular?

Lumapas: Keeping abreast with all the regulations, all the technology, all the changes taking place in the environmental field. That's a factor I think is quite important and needs to be enhanced.

Dunder: We need people with good educational backgrounds, but education is not the prime consideration with us. That, I believe, is hands-on, good, practical experience, someone able to make pragmatic decisions out in the field.

Rowe: What kind of training is required to make such decisions? Is it technical or theoretical?

Dunder: Well, it's technical. But I think the other big thing is the ability to work with people.

Ellis: I would want someone with a master's or Ph. D. in one of a variety of disciplines, anywhere from fisheries to wildlife to botanical resources. On top of that, one thing that is really lacking in people coming out of school right now is the ability to write.

Cullivan: Everybody in my company certainly has a high school education and we have quite a number of graduate degrees, but Bob is right, there are a lot of people who don't seem to be able to read or write as effectively as they could.

Gillaspie: I think our educational needs [illegible] fold. First, we need [illegible] science schools to [illegible] people to employ [illegible] access to the newest [illegible] best technologies. [illegible] we need on-going education on changing regulations, so we can keep up. Lastly, for a lot of us who are breaking out and going into business on our own, we need a good business education because we're much better scientists than we are business people.

OREGON KEY INDUSTRIES ECONOMIC DEVELOP

Skoda: I think we're developing needs for people who are more generalists than specialists. I think there is a real need for environmental managers who are equivalent to masters of business administration.

THE PANELISTS

▲ Ken Dunder,
Hydrokinetic Systems, Inc.
▲ Bryan Cullivan,
Data Control Systems, Inc.
▲ Janet Gillaspie,
Environmental Strategies
▲ Ned Dempsey, Century
West Engineering
▲ Paul Skoda,
Cascade Earth Sciences, Ltd.
▲ Candee Hatch,
CH2M Hill
▲ Robert Ellis,
Ellis Ecological Services, Inc.
▲ Teresita Lumapas, (C2E)
Cross-Continent Engineers
▲ David Rowe,
Moderator, Oregon Business

A CLUSTER OF EXPERTISE

Oregon's decision of the 1960s to clean up its rivers and streams may seem long past, but it defines Oregon nationally and internationally as clean and green – and it reverberates through the state's community of environmental services companies. For if Oregon's environmental services can be said to be unique among those available in the United States, the clean water connection defines its originality.

The Pacific Northwest's reputation for livability is largely built around its relatively pristine environment – its forests topped with snow-capped peaks, its unspoiled landscapes, and especially its rushing rivers and still, clear lakes.

The environmental concerns that led to the passage of the federal Clean Water and Clean Air Acts, the various components that together comprise the Superfund legislation and the numerous other laws that govern the ins and outs of environment-friendly industrial operations led to the creation of a full range of private Oregon firms offering vastly diverse environmental services.

WHAT THEY DO

The environmental industry includes products and services to prevent, remove, or neutralize environmental pollution. Industry activities include waste management, environmental management and consulting services, environmental restoration and rehabilitation services (such as spill clean-up), pollution abatement and control, engineering and manufacturing of equipment or materials designed to perform the above tasks, recycling and conservation services, and energy conservation services or products

Riedel Environmental Technologies of Portland is one of the world's premiere environmental cleanup companies. CH2M Hill, founded in Corvallis, is among the world's largest environmental engineering companies. A tier of smaller firms such as Century West Engineering provide services competitive with those of the state's giants. Other, smaller companies operating within narrow niche markets comprise the bulk of Oregon's environmental services industry, and own the bulk of the knowledge and experience that make Oregon one of the world's centers of clean water technology.

One such company is Beta Control Systems, Inc. of Beaverton, which designs, manufactures and installs water and acid recycling systems for the primary and secondary metals finishing industry.

Like many other Oregon companies, Beta Control can trace its origins to Tektronix, where founder and president Bryan Cullivan cut his environmental teeth working on cleanup systems for Tek's production waste water. Like many entrepreneurial companies, Beta Control began in a garage and moved to larger quarters as sales increased and additional floor space was needed for offices and manufacturing operations.

And like many other Oregon environmental companies, Beta Control speaks the language of investing in environmental systems as an industrial asset to its potential customers. "Sometimes we have to walk people through the numbers to make them see we're going to save them money rather than cost them money," said Marketing Director Joe McDonnell, "but once we can show them where to look for costs they won't have to pay anymore and how to figure which indirect costs they're avoiding, a buy is almost automatic.

"Especially when they figure out for themselves that the payback period is less than two years, as it is with all but the smallest metal finishers."

Beta Control stands on the brink of taking its locally developed technologies and locally manufactured systems to the world. McDonnell has found receptive audiences for his message in Canada, Mexico, Taiwan and Brazil over the last several years.

Beta Contol is not alone. Numerous Oregon environmental companies are finding markets for their technologies outside the state and outside the country. And they are taking the Oregon clean water message to the world.

GETTING ORGANIZED

One of the truisms of business is that companies that cooperate can become more competitive and develop a stronger industry. Increasingly, this is the genesis of trade associations such as the Oregon Environmental Technology Association (OETA).

"We aim to establish Oregon's environmental industry as a world class provider of products and services to resolve environmental problems. This industry partnership is a vital strategy," says Bill Snyder, OETA executive director.

OETA was formed by a group of companies in the Eugene/Springfield area in the fall of 1991. "We were basically meeting as a Lane County group. We agreed we would be more effective if we worked through a state-wide trade association, but when we started looking around, we realized that nothing like we had in mind existed," Snyder says.

In September, 1992, OETA was awarded $40,000 in matching Oregon Lottery funds from the Oregon Economic Development Department (OEDD) Key Industries Development program to assist in creating a state-wide organization to promote and develop Oregon's environmental services industry. This program works as a catalyst to help key industries grow in Oregon and increase international competitiveness through avenues such as associations and business networks.

Estimates are that the environmental industry will generate more than $400 billion in annual revenues world-wide by 1996. It is generally recognized as one of the fastest-growing jobs-producing sectors in the United States and globally. Growth is fueled by public concern over environmental degradation, by government regulations, and by cost-savings to businesses.

OETA has a full slate of activities on the drawing board: It is making an inventory of Oregon environmental industry companies and their capabilities. This will lead to a data base that can be used for planning, marketing, and creating joint ventures. It is pursuing services in national and international marketing, technology development and transfer, finance, and insurance. OETA and Oregon industry leaders are creating a white paper on developing Oregon's environmental technology and services industry.

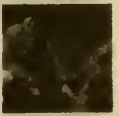
The need for the environmental industry to become stronger through organization is illustrated by the establishment of recent international trading groups in countries such as Japan and Canada Snyder says. Worldwide competition is strenuous in this high growth industry.

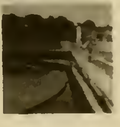
Ned Dempsey, President of Century West Engineering in Portland, agrees that industry organization is key. "OETA has great potential for the Oregon industry, but my feeling is that in order to realize that potential, the state will have to continue to be active in its development." The success of the industry, he observes, hinges on legislative and executive agreement that its development is important to Oregon's future.

Roundtable Proposals

The roundtable explored ways to create a stronger environmental services industry in Oregon. Some of the suggestions:

- ▲ **Market the Oregon environmental technology and services industry and Oregon firms nationally and internationally.**
- ▲ **Form alliances with Pacific Northwest Region environmental industry and government leaders.**
- ▲ **Build the Oregon Environmental Technology Association.**
- ▲ **Develop industry quality and ethical standards to create an Oregon signature that stands for customer satisfaction.**
- ▲ **Educate Oregon businesses about the economic benefits of environmentally safe manufacturing.**
- ▲ **Improve the ability of Oregon higher education to meet Oregon business' needs for new technologies.**
- ▲ **Work with Oregon educational institutions to turn out science graduates with greater writing, problem-solving, and business skills.**





THE PLANET IS OUR CUSTOMER

The growth and development of industrial society over the last couple of centuries occurred without much concern for the natural world. The world's resources were thought to be unlimited in their capacity, but the planet has proven fragile. People around the world are becoming aware of how human activity affects the environment, and they are investing in efforts to minimize the impact. These efforts present opportunities to companies that clean up yesterday's messes and show us how to keep from messing up again.

Environmental technology companies in Oregon are poised to play a role in global efforts to clean and protect the environment. The state gained a reputation as a leader in environmental protection years ago when it undertook to clean the Willamette River, legislated the first bottle return system and the first statewide land use planning system in the country. These undertakings and Oregon's interest in environmental quality helped a strong contingent of environmental technology companies get started.

Mexico is one promising international market for Oregon's environmental technology companies. The Mexican government has substantially increased spending on the environment, and pressure from the expected approval of the North American Free Trade Agreement (NAFTA) has encouraged Mexican companies to begin cleaning up their manufacturing processes.

Environmental technology companies from Oregon have already hit pay dirt in the Mexican market. Trade missions from Oregon to Mexico in 1992 resulted in almost $622,000 worth of sales for Oregon environmental firms. More than 50 Oregon companies heard the latest about the Mexican wastewater treatment market at Agua-Mex '92, a June 1992 conference sponsored by the Oregon Economic Development Department (OEDD), where eight Mexican representatives spoke.

The Portland office of Hart Crowser, an environmental consulting firm, obtained a major contract with SEDESOL, the Mexican government's environmental agency, as a result of that conference.

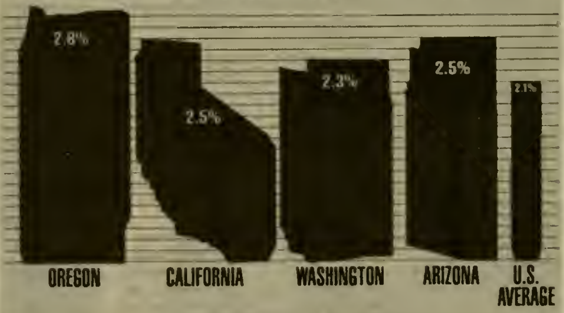
Southeast Asia's annual market for environmental goods and services is expected to grow to $11 billion by 1996. American and Asian business, government and community groups have created the United States-Asia Environmental Partnership to enhance Asia's environment while providing opportunities for American firms.

Taiwan has allocated nearly $40 billion to environmental protection projects in its current six-year plan. A primary goal is to provide infrastructure to minimize the effect of municipal and industrial waste generation around the island.

On the opposite end of the Eurasian continent, Eastern Europe and the countries of the former Soviet Union are suffering from staggering pollution and a lack of environmental infrastructure. In the former East Germany, where the German government will invest $26 billion in 1993, estimated costs of the environmental cleanup are $135-$335 billion. A delegation of economic development officials from the former East Germany visited Oregon recently to

REVENUE BY STATE

1991 estimated environmental services industry revenues* as a percentage of gross state product.



* From Environmental Business Journal, San Diego, CA 619-296-7686

search out promising firms for joint ventures with German companies.

"Opportunities are real for firms that have promising technologies and are willing to seek new opportunities," says Klaus Kleber, of The Meridian Group International, a Portland consulting firm that hosted the meetings with the German delegation.

Closer to home, work at Department of Energy and Department of Defense facilities will generate billions of new business dollars over the next decade or more. For Oregon companies, Hanford is a potential opportunity close at hand. Portland's Century West Engineering recently formed a joint venture with a Canadian firm to pursue Hanford clean-up contracts.

"Our joint venture with Elemental Research has enabled us to submit proposals for contracts at Hanford using a unique technology that determines extremely low levels of metal concentrations in all kinds of media," says Ned Dempsey, president of Century West Engineering.

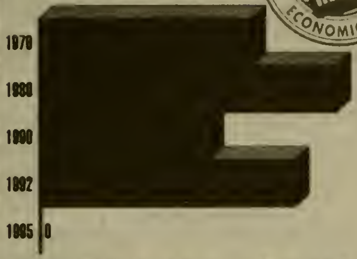
As governments invest in environmental clean-up and implement regulations, the industries that pollute the environment are learning the benefits of changing processes to prevent pollution. This awareness extends the market into every corner of the globe.

OREGON PAYROLL: AVERAGE 1991 PAYROLL PER WORKER

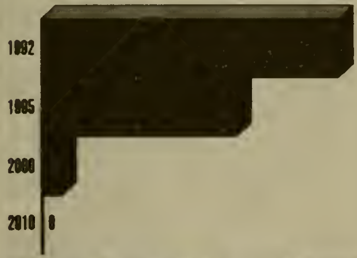
Selected Industries	$$
All Industries	$22,224
Agric, Forestry, Fishing	$13,599
Mining	$31,031
Construction	$26,490
All Manufacturing	$28,166
Food & Kindred Products Mfg	$20,936
Lumber & Wood Products Mfg	$25,925
Paper & Allied Products Mfg	$41,100
Printing & Publishing	$33,032
Chemicals & Allied Products Mfg	$33,032
Primary Metals Mfg	$35,352
Fabricated Metal Products Mfg	$26,463
Industrial Machinery Mfg	$32,113
Electronic Equipment Mfg	$33,450
Transportation Equipment Mfg	$32,266
Instruments Mfg	$33,626
Transportation, Commun, Utilities	$29,173
Wholesale Trade	$28,749
Retail Trade	$13,319
Finance, Insurance, Real Estate	$25,303
Services	$19,093
Business Services	$18,667
Health Services	$23,165
Legal Services	$30,431
Engineering & Mgt Services	$29,537

DATAFILE

Benchmarks adopted by the State of Oregon showing past performance and future objectives



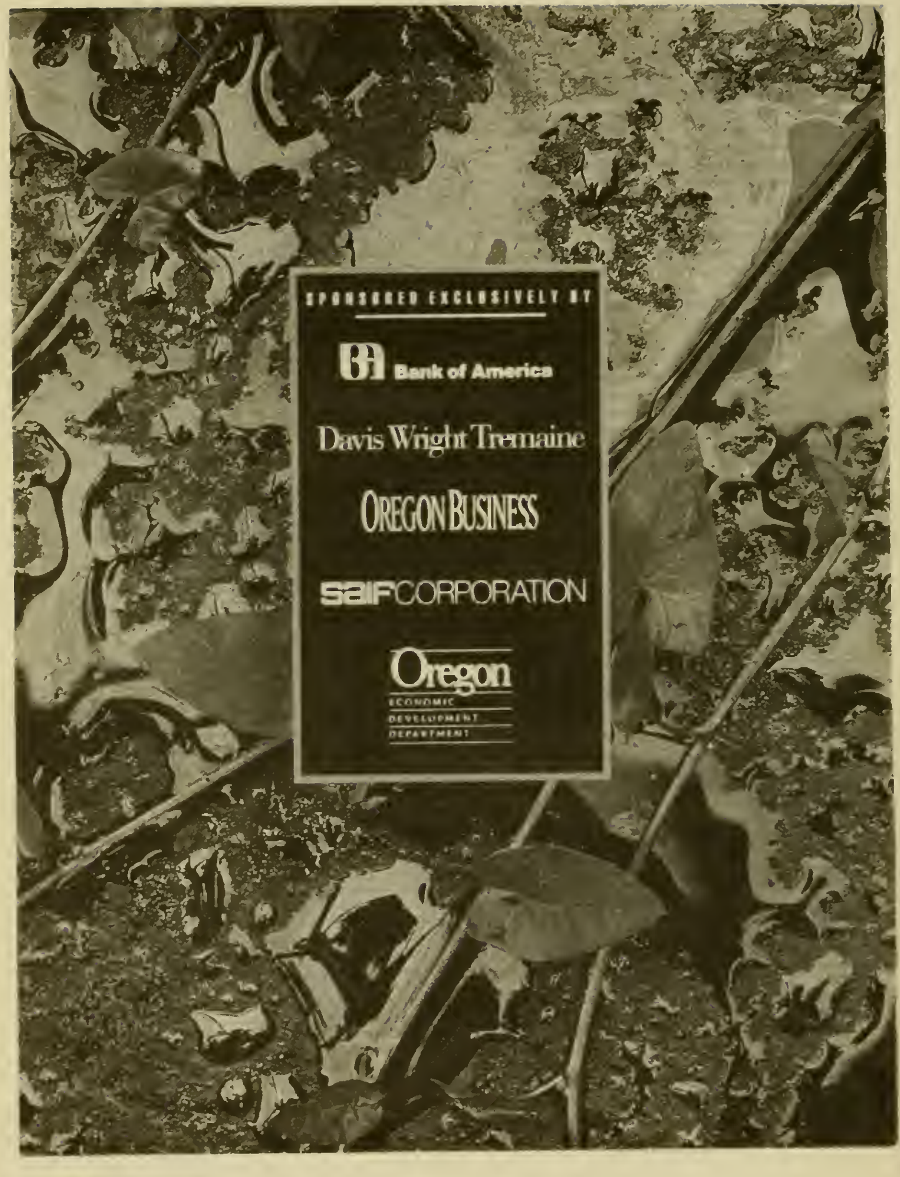
Air Quality Benchmarks Number of areas not in compliance with ambient air standards and therefore unable to accommodate additional development.



Water Quality Benchmarks Number of areas not in compliance with water quality standards and therefore unable to accommodate additional development.

BUSINESS RESOURCES Area Code 503

Advanced Science and Technology Institute	346-3189
Environmental Learning Center	657-6958, ex. 2351
International Trade Institute	725-3246
Joint Graduate Engineering Schools	737-6836
Oregon Advanced Technology Center	657-6958, ex 4609
Oregon Assn. of Environmental Professionals	226-0324
Oregon Environmental Technology Association	344-0746
Oregon Marketplace	343-7712
OEDD Key Industries Development	378-2286
Oregon Innovation Center	800-548-8435
OEDD International Trade Division	229-5625
Portland Development Commission	823-3302
Small Business Administation	326-2682
Small Business Development Centers	726-2250
Small Business International Trade Program	274-7482
Western Region Hazardous Waste Research Center	737-6836



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OREGON BUSINESS

SAIF CORPORATION

Oregon
ECONOMIC
DEVELOPMENT
DEPARTMENT

PEACE CORPS
OF THE UNITED STATES

February 26, 1993

The Honorable
Gerry E. Studds
Chairman
Committee on Merchant Marine and Fisheries
Subcommittee on Environment and Natural Resources
U.S. House of Representatives
Washington, D.C. 20515

Dear Chairman Studds:

Thank you for your recent letter in which you request comments from the Peace Corps on the outline of the National Environmental Technology and Business Competitiveness Act.

While the overall proposal goes beyond the mandate and scope of the Peace Corps, there are two areas in which Peace Corps has had considerable experience. We much appreciate the opportunity to share our comments on these issues with the Subcommittee.

1. Volunteer Environmental Services Corps

Peace Corps currently supports nearly 700 Volunteers in 55 countries working on environmental projects. One of the exciting new areas in these projects is environmental protection. Especially in the countries with economies in transition, Peace Corps is being called on to provide Volunteers with expertise in both "green" (resource conservation and biodiversity) and "brown" (air and water pollution and solid waste management) environmental problems.

Peace Corps works closely with other private and federal agencies to support the Environment Volunteers. The National Park Service, Fish & Wildlife Service, and U.S. Forest Service have been cooperating with Peace Corps for an extended period of time. More recently, Peace Corps has been collaborating with the U.S. Environmental Protection Agency -- EPA.

One example already underway that involves the kinds of activities outlined in the proposal is the U.S. - Asia Environmental Partnership, a cooperative effort involving federal agencies (USAID, Commerce, Agriculture, Smithsonian, Peace Corps, and others) plus private sector business and environmental groups. It is funded by USAID and coordinated by a consulting firm, Tropical Research & Development.

We believe you should consider carefully whether the proposal for a new Volunteer Environmental Service Corps would duplicate capabilities that already exist in the Peace Corps and elsewhere. Peace Corps is ideally positioned with existing recruiting and in-country administrative capability to identify, recruit, train, and support qualified Volunteers for a broad spectrum of environmental assignments. The Peace Corps has a thirty year record of success as a Volunteer sending organization. Further, our approach is consistent with President Clinton's counsel that we seek ways to do more with existing foreign assistance funds.

2. Business Centers and Environmental Business Centers

Peace Corps currently supports more than 1,000 Volunteers working on small business projects worldwide. One of the new program areas involves the support of small business development centers. Primarily located in countries making the transition from centrally planned to free-market economies, the business centers are staffed by mature, experienced Business Volunteers with expertise in business operations, banking and finance, and economic planning. These business advisors assist local governments in the privatization process, and provide training, counseling, and information services to emerging private businesses. The service centers are operated by local municipalities, banks, and non-profit organizations, with Peace Corps Volunteers providing staff support and, in collaboration with USAID, some equipment.

While Peace Corps' principal mandate is to assist in building strong local private sectors with domestic markets, on a limited scale we also assist businesses with export goods and services.

One issue that has been raised in the past is the possible co-location of Peace Corps Volunteers with the Department of Commerce's "America Houses." As a matter of policy, Peace Corps Volunteers are prohibited from profiting personally from business transactions during their period of service. We would be concerned about the impact on the credibility of our Volunteers of any proposal that would give the appearance that Volunteers are directly serving the interests of the U.S. business community in their host countries.

Peace Corps collaboration with U.S.I.A. and the Department of Commerce now focuses on technical information, and Volunteers make U.S. and international trade data available to local businesses. It is our feeling that co-location of Peace Corps Volunteers with Commerce Department business centers might jeopardize the role that the Peace Corps Volunteers can play as business teachers and advisors with no vested interest other than helping local business communities flourish.

Our primary concern about the proposed Volunteer Environmental Services Corps is that the new institution might duplicate efforts and activities already underway by the Peace Corps.

I hope that these comments are useful, Mr. Chairman. Peace Corps is very pleased with the number of quality environmental programs we have launched in the last few years. If you would like specific details about our projects, I would be delighted to provide the information.

Thank you again for giving the Agency the opportunity to comment on your outline of proposed legislation. Your continuing interest in and support for the Peace Corps is very much appreciated.

The Office of Management and Budget advises that there is no objection from the standpoint of the Administration's program to the submission of this report.

Sincerely,

John P. Hogan

John P. Hogan
Acting Director

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